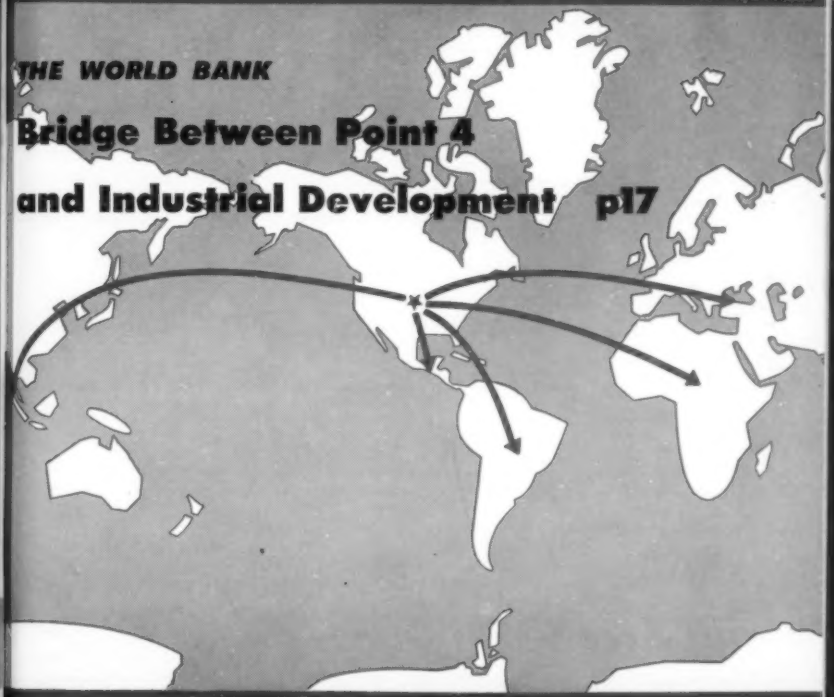
McGraw-Hill DIGEST

MARCH 1950

BUSINESS · ENGINEERING · INDUSTRY



THE WORLD BANK

Bridge Between Point 4 and Industrial Development p17

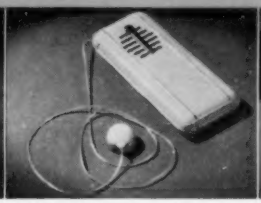
Contents—Page 3 Production Ideas—Page 61

HIGH in sales appeal

STYRON

THE PREFERRED PLASTIC

Kitchen Utensils. Use of colour-bright Styron brings new sales appeal to such standard items as kitchen equipment.



Hearing Aid. Extreme lightness of weight plus subtle colours that bring dignified appearance make Styron ideal for such applications.

Razor Blade Dispenser. Styron in practical uses such as this brings those "extra features" that boost sales.

• Have you noticed the many instances in which Dow's famous plastic, Styron (Dow polystyrene), brings added sales appeal to a wide range of items?

Styron may be the ideal material to bring *new life . . . new sales appeal* to your product. It is available in a wide range of colours and has outstanding dimensional stability. In addition to Styron as a sales builder, it can bring outstanding production economies when properly used.

Learn more about the plastic that builds product sales. Contact Dow today for expert technical advice and the names of competent moulders.

DOW CANADA

DOW CHEMICAL OF CANADA, LIMITED

204 RICHMOND STREET WEST **TORONTO 1, CANADA**

UNDERWOOD SUNDSTRAND ADDING MACHINE

Easy to learn . . . unsurpassed for its speed and accuracy. Your fingers ripple over the simple "10-figure-key" keyboard . . . touch a motor bar . . . and there's your total. It's as simple as that . . . and as fast. Even untrained operators pick up the "touch" method . . . after only a few minutes' practice. Available in manual or electric models.

UNDERWOOD

Sales and Service Throughout the World • Consult your local Underwood Dealer or write to us

UNDERWOOD CORPORATION

International Division

ONE PARK AVE., NEW YORK 16, N. Y., U. S. A.

Typewriters • Adding Machines • Accounting Machines • Carbon Paper • Ribbons

GREATER INDUSTRY, GREATER EMPLOYMENT ... through GOOD ROADS

Good road systems produce benefits that secure economic and social betterment for everyone. By opening remote regions to settlement, they stimulate the growth of industry ... make available the productivity of mining and agriculture ... quicken the movement of goods in your own community. Good roads help create more jobs for you and your neighbors. Your community becomes more prosperous and enjoys a higher standard of living.

Many thousands of miles of good roads have been built at low cost with Esso asphalt. After many years of hard use, these same roads continue to render excellent service. If you have road construction or maintenance problems, Esso engineers are pleased to place their knowledge and long experience at your service. Consult the nearest Esso office.

Stop at the nearest Esso Sign for Quality Petroleum Products and Service

BETTER LIVING THROUGH BETTER ROADS

VOLUME 5
NUMBER 3

Member — Audit Bureau of Circulations

McGraw-Hill Digest is published monthly by McGraw-Hill International Corp. for circulation in all countries except the United States and Canada. Publication and executive offices, 330 W. 42nd St., New York 18, N. Y., U.S.A. James H. McGraw, Jr., President; Eugene P. Warner, Vice-President and General Manager; James L. Gilbert, Senior Vice-President; John F. Chapman, Vice-President; George Quisenberry, Vice-President; Curtis W. McGraw, Treasurer; Joseph A. Gerardi, Secretary; J. Clifford Stark, Vice-President and Asst. General Manager; Basil G. Davidson, Vice-President; K. Presbrey Bliss, Vice-President and Director of Advertising; J. E. Blackburn, Director of Circulation. *Subscriptions may be ordered through Director of Circulation, through local book dealer, or McGraw-Hill, Aldwych House, London, W. C. 2 (British only.)* Subscription rates: $5 for 1 year, $8 for 2 years, or $10 for 3 years; single copy 50¢ (U. S. currency). Entered as second-class matter December 17, 1947, at the post office at New York, New York, under the Act of March 3, 1879.

MARCH CONTENTS

Bridge Between Point 4 and Industrial Development 17
World's Capital Takes Shape 20
Plywood in Construction Today 25
Dinking Dies Blank Metal Parts 30
Plastics Find Many Applications 34
80-Octane Straightrun Gasoline 40
Boom in Porcelain Enamel 50
Keep Your Plant Up, Costs Down 54

AVIATION
Lightplane Geared Engine . . . 21
Turboprop Best on Transports . 24
British Jets Licensed to Italy . . 44

CHEMISTRY
Borax Reduces Straw Spoilage . 41
How to Weld Thermoplastics . 44
Antihistaminics Fight Colds . . 53

CONSTRUCTION
Clears Land for $85 per Acre . 29
Test Rapid Sand Filters 45
Deliver Materials by Truck . . . 51

ELECTRICITY, POWER
Boiler-Slag Prevention 23
Light Loses a Customer 33
Unique Distribution System . . . 51

ELECTRONICS, RADIO
Textile Moisture Control 29
New Audio Trends 36
Tests Radiant-Heating Lines . . 42

FOOD PROCESSING
Spots Bangs Disease 22
Quicker, Easier Sanitation 31
Longer Lemon Life 41

MECHANICAL DESIGN
Improves Photo-Grid Method . 28
How to Cut Assembly Costs . . 37
Curvic Coupling Finds Uses . . 42

METALWORKING
Tips from Top Welding Men . . 32
Tricky Metalworking Techniques 37
Low-Carbon Stainless Steel . . . 51

MINING, PETROLEUM
Oil-Well Logging Method . . . 21
World Oil Production 27
Conveyors for Haulage 52

PLANT MANAGEMENT
Group Bonuses Up Output . . . 26
Money-Saving Ideas 28
Compressed Air Saves Time . . 41

TEXTILES
Pressed-Rivet Needles Best . . 24
New 2-for-1 Twister 28
Develop Novelty Yarns 32

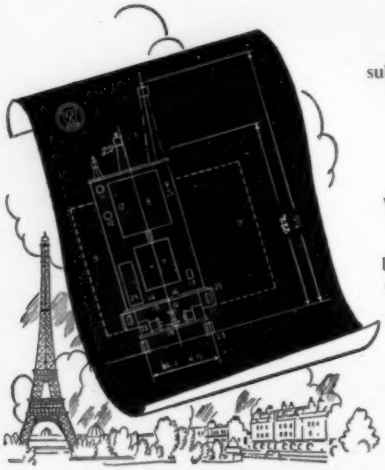
TRANSPORTATION
Nash Nixes NXI Now. 27
Heater for Parking Lots 36
Electric Rotary Snow Plow . . . 37

John F. Chapman *Publisher*
Harry S. Wharen *Editor*
J. H. McKee, Jr. *Managing Editor*
Dexter M. Keezer *Economics Dept.*
Russell F. Anderson *Editor, World News*
George B. Bryant, Jr. *Washington Bureau*

COPYRIGHTED, 1950 by McGraw-Hill International Corp., 330 West 42nd Street, New York 18, New York. Reproduction of items in full or part without written permission prohibited in all parts of the world.

Westinghouse Transformers

TO BRING MORE POWER TO PARIS INDUSTRY

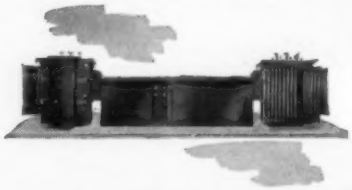


Electricité de France, one of the largest groups of utilities in Europe, specified a substation to transform 100,000 kva, 3 phase 215,000 volts to 60,000 and 11,000 volts. Each of the 3 single phase transformers in the substation had to operate in cells of such size that it presented a problem of physical limitations.

Westinghouse engineers found a practical solution by designing the transformers with specially located radiators and bushings. Each unit is triple rated for self cooling, forced air cooling and forced oil with air coolers. Thus capacity of the transformers can be efficiently utilized. Completion of this new substation will provide much needed power for industry in France.

UNIT SUBSTATIONS

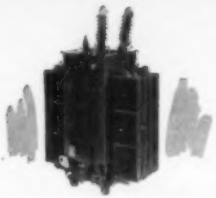
Westinghouse Unit Substations provide the most modern and efficient method of ordering, installing and operating electric power distribution equipment for any system requirement. The Unit Substation, with transformer and necessary switchgear, is a coordinated unit to which the subtransmission and primary feeder circuits can be directly connected.



Westinghouse

POWER TRANSFORMERS

Westinghouse has long been recognized as a leader in the engineering and design of transformers over 500 kva with ratings up to 500,000 volts. Typical are: the Westinghouse Core Form Power Transformers rated at 501 to 5,000 kva single phase and 750 to 10,000 kva 3 phase; the Westinghouse Shell Form Transformers rated above 5,000 kva single phase and above 10,000 kva three phase.



DISTRIBUTION TRANSFORMERS

Whatever the distribution system requirements there's a Westinghouse transformer to fill the need in ratings from 3 to 500 kva for indoor or outdoor service. An outstanding Westinghouse development is the CSP Distribution Transformer available from 3 to 100 kva, 480 to 14,400 volts. Important features of this oil-immersed unit are low cost installation and Complete Self-Protection.

DRY TYPE TRANSFORMERS

A complete line of Westinghouse Dry Type Transformers are available to fit any distribution job from control circuits to lighting and power circuits. The Westinghouse Dry Type Power Centers, consisting of transformers close-coupled to metal-enclosed switchgear are available in ratings from 100 to 2000 kva —High voltage up to 15 kv and low voltage up to 600 volts. They require only the connection of high and low voltage feeders to complete the installation.

SEND FOR COMPLETE DATA!

For detailed information on the equipment mentioned in these pages see your local Westinghouse distributor or check the coupon at right and mail. Complete information is available on request for all other types and sizes of transformers.

Westinghouse Electric International Co.
40 Wall Street, New York 5, New York P-1C

Please send me information on the following Westinghouse Transformers:

- ☐ Unit Substations
- ☐ Power Transformers below 5,000 kva DB-47-600 C
- ☐ Power Transformers above 5,000 kva DB-47-600 S
- ☐ CSP Distribution Transformers DB-46-100 CSP
- ☐ Dry Type Transformers B-4009
- ☐ Dry Type Power Centers DB-48-510-D

Name_____

Title _____

Company_____

Address_____

Electrical Products for World Progress

A-2504-X

NYLON . . . the fiber that builds strength into airplane tires . . . makes this ruffly, sheer blouse that's long-wearing, easy to wash—needs little or no ironing.

NYLON: example of the pioneering of Du Pont chemical research

The chemist whose experiments led to the miracle fiber nylon was doing a familiar job at Du Pont . . . looking for, and finding, ways to improve on nature.

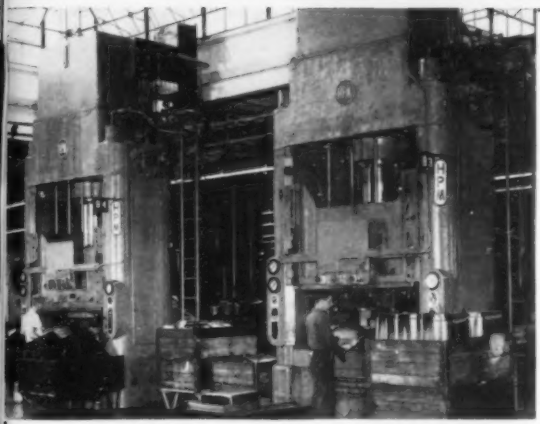
This constant search brings a steady parade of new products out of Du Pont laboratories to help raise the world's standard of living. More than half of Du Pont sales today are of products which weren't known in the United States in 1928. Manufacturers the world over know it pays to keep up to date on what's taking place at Du Pont.

• • •

FREE! *36-page illustrated Du Pont Magazine. This English-language publication contains the latest information on the world of chemical research and on Du Pont products. Will help you keep abreast of important developments that may affect your business . . . your future. To receive your copy promptly, write to E. I. du Pont de Nemours & Co. (Inc.), Dept. J-1, Export Advertising Section, Wilmington 98, Delaware, U.S.A.*

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY



Write for free copy of the story about 1900's new stamping plant which recently appeared in a prominent American trade journal.

BIG AMERICAN LAUNDRY MACHINE MAKER CHOOSES H-P-M PRESSES FOR NEW STAMPING FACTORY!

Two H-P-M hydraulic presses, installed twelve years ago in the factory of Nineteen Hundred Corp., proved that H-P-Ms are best for deep drawing sheet metal. As a result, when this company established its new stamping plant last year, seven more H-P-M presses were installed for deep drawing Kenmore and Whirlpool washing machine, ironer and dryer parts.

These H-P-M presses have eliminated complete drawing operations, reduced down time and scrap loss, and improved quality. Investigate what H-P-M presses will do for you. Write today.

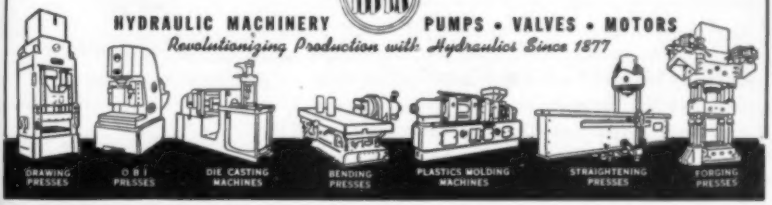
THE HYDRAULIC PRESS MFG. COMPANY

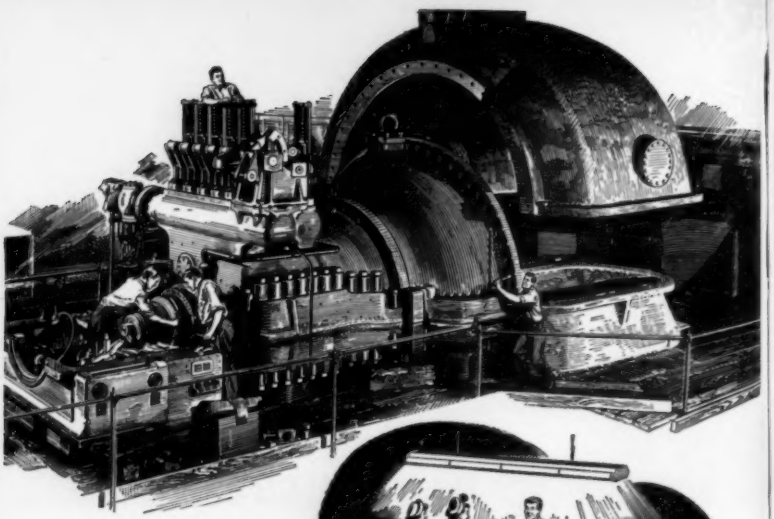
3012 Marion Road **Mount Gilead, Ohio, U. S. A.**

HPM

HYDRAULIC MACHINERY **PUMPS • VALVES • MOTORS**

Revolutionizing Production with Hydraulics Since 1877





Your health protected...

A General Electric steam turbine can increase a country's power supply, expand its industries, enlarge food production, stimulate new buying among people. It can make possible many benefits such as modern refrigeration. G-E refrigeration increases food supplies through safe transportation and storage — it keeps food fresher, more healthful, better to eat. General Electric will serve you successfully, however you use electricity. A-50-2

The Standard of Excellence

THROUGHOUT THE WORLD . . .
IN INDUSTRY AND HOME

GENERAL ELECTRIC
U.S.A.

Business Trends

BRITAIN IS TAKING energetic steps to lessen the dollar shortage. Keys to the program: cutting dollar purchases, redirecting exports from sterling markets to the dollar area, stronger sales promotion in the U. S.

Britain plans to spend 16% fewer dollars in the fiscal year 1950-1951, as compared with the fiscal year 1949-1950. The cut is made necessary by a smaller Marshall Plan appropriation. Another 12% cut in dollar spending is foreseen for the year 1951-1952.

Many British products are seeking U. S. markets (see McG-H Digest, Feb, p17).

- **British speed boats** enjoyed an outstanding success at the mid-winter pleasure boat show in New York. In spite of tariffs and transportation costs, the British boats undersold comparable American products by a most substantial margin.
- **A group of small U. K. paint manufacturers** have decided to market under one brand name a full line of paints in the U. S. Through standardization and joint marketing, these manufacturers have cut handling costs considerably. They already have had a considerable success on the Latin American market and now have high hopes for good dollar earnings.
- **Scientific instrument producers** are determined to establish a permanent foothold in the U. S. market. They are trying to meet the prices of their U. S. competitors and to match the prompt delivery dates of the domestic producers.

Many British goods find a better dollar market in Canada than in the U. S. The American market for cars and machinery is difficult to penetrate because of the great efficiency of American production. Trade barriers also put foreign producers at a disadvantage.

British-made cars chalked up a high volume of sales in the U. S. in the years immediately following World War II, when American cars were scarce. Since then sales have declined. In 1948, 26,000 units were sold. In 1949, total sales were only 18,000 units in spite of lower prices. Prospects for the future are poor. In contrast, sales in Canada have increased from 14,000 units in 1948 to 30,000 in 1949, and there are good possibilities of further expansion in that market.

Re-channeling of British exports to the dollar area presents great difficulties. A large part of the British trade now goes to pay for the sterling debt held by the dominions—particularly India. The dominions are unwilling to scale down or to fund the debt.

Now the dominions are demanding an even greater proportion of the dollars earned by the entire sterling area. An agreement probably will be reached on the sterling debt during the coming year. Part of the debt will be funded in

Business Trends (Continued)

long-term bonds. That would permit Britain to sell less to her creditors and more to the U. S.—and so help solve the dollar problem.

LATIN AMERICAN SCENE presents a mixed picture.

COLUMBIA is enjoying a great prosperity wave. High coffee prices are the main reason for the boom. Coffee exports alone are expected to earn in 1950 at least $120-million more than in 1949. Other agricultural products, such as cattle, bananas, and sugar, are also finding a good export market.

The dollar situation in Colombia is improving. Exports in 1950 will be higher than in 1949. Fewer dollars are needed for imported machinery because industrial expansion programs are practically completed. Thus more dollars will be left to buy other goods.

Trade with the United Kingdom is slow to develop because Colombia has an acute sterling shortage. But trade with Germany is growing fast.

There are danger signals on the economic horizon. The political situation is still unstable. There are definite signs of inflation. Businessmen fear governmental interference in industry. A new minimum wage law has raised production costs. Basically, though, Colombia's economy is strong.

Brazilian dollar shortage has been relieved through the windfall from coffee. Brazil coffee prices are at a record level. They are expected to remain so during all of 1950 because American demand is strong and dollar sales promise to remain at a high level.

Brazil is using its dollars to strengthen its trade position. The backlog of trade debts is being paid at a high rate. The country is also saving dollars by replacing some imports from the U. S. with goods from soft-currency countries.

Brazilian efforts to cope with the dollar shortage benefit Belgium. Many lines of Belgian goods—chemical machinery and products, combed wool yarn, cement, coke, coal, machinery, and many others—find excellent markets in Brazil. Belgium normally has had an unfavorable balance of payments with Brazil. But now Belgium exports so much to Brazil that businessmen fear a franc shortage.

Argentina suffers from both dollar and sterling shortages. But higher Argentine exports to the U. S. are being forecast—in the order of 1948's $180-million. Sales last year were only half that amount.

Wool, hides, and cheese began moving after export restrictions (applied at time of devaluation) were removed. Other commodities have failed to move—and Argentina is supposed to hold over a billion dollars worth of agricultural products. Businessmen are pessimistic over imports because failure to implement import regulations gives no idea of what new imports will cost.

Get More Service out of Wood

TO GET MORE service out of wood, protect it against rot and insect attack with Santophen 20, Monsanto's pentachlorophenol. It makes wood last longer.

Santophen 20, properly formulated, gives a clean treatment. It stays in the wood — doesn't combine with water. Its protective value remains constant for years, even in damp areas or insect-infested soil.

Electric-light and telephone poles last many years longer when protected with solutions of Santophen 20. So does lumber used in homes, roofs, floors, loading platforms, shipping docks, bridges. Farmers, too, profit by using building lumber and fence posts protected with Santophen 20.

These are just a few of many cases where everybody can get more and longer use out of wood when it is treated with Santophen 20 — the wood preservative that is always effective because its protective qualities are constant.

If you make wood preservatives, or treat lumber of any kind, consult your local Monsanto representative. He will gladly give you much useful information. Or, write any Monsanto Office for technical data . . .

MONSANTO CHEMICAL COMPANY, *St. Louis 4, Missouri, U. S. A.* • MONSANTO CHEMICALS LTD., *London* • Monsanto (Canada) Ltd., *Montreal* • Monsanto Chemicals (Australia) Ltd., *Melbourne.* Representatives in principal cities of the world.

Santophen: Trade-mark registered in the U. S.

MONSANTO
CHEMICALS – PLASTICS

SERVING INDUSTRY... WHICH SERVES MANKIND

Saving money by preserving wood is only one of the many ways Monsanto serves industry with more than 400 chemicals and plastics that are used in more than 20,000 finished products. If you are an executive — no matter what your line of business — it is probable that Monsanto can help you. Ask a Monsanto representative about ways to reduce production costs, improve products and increase sales.

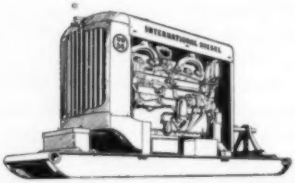
This is the stuff prosperity is made of...

MODERN ROAD-BUILDERS do big things as they push highways forward through every conceivable type of terrain.

What's the answer? What keeps construction on a rigid time schedule and costs at a *pre-determined* low? It's *power*... the kind found in sturdy dependable International Diesel engines. They've built a reputation on performance and economy!

Check your construction program, check your power needs, see your International Industrial Power Distributor. This three-point planning makes it possible to build better roads at lowest possible cost.

INTERNATIONAL HARVESTER EXPORT COMPANY
180 North Michigan Avenue, Chicago 1, U. S. A.



The rock crusher shown above is powered by an International UD-24 180 h.p. Diesel Power Unit —one of six Diesels in the International line. Five carbureted models are also available.

INTERNATIONAL HARVESTER

Builder of Essential Equipment
McCormick International Farm Tractors & Farm Equipment
International Harvester Refrigeration

for Essential Work
International Trucks
International Industrial Power

Washington Report

U. S. FAR EASTERN POLICY is now definite, despite harsh attacks by administration critics. Secretary of State Acheson is convinced that Russian imperialism will clash with Asian nationalism. That is why you see U. S. policy moves emphasizing Stalin's interference in Chinese affairs, at the same time steering clear of anything that leaves the U. S. open to the same charge.

Basic diffrences in Chinese and Russian interests support Acheson's theories. Mao, who rules more people than Stalin, counts himself a full-time partner; Stalin considers him a satellite, expects him to toe the Moscow line. Mao counts on Russian economic aid in carrying out his promises to China's 450-million people; the Russians continue their plans to bleed away China's resources.

Acheson is sure that time will show up Mao's hard-won Soviet friendship treaty for the farce it is.

The future, he thinks, leaves only two alternatives: either Mao sells out to Moscow and is eventually swallowed up by his own people, as all foreign-sponsored Chinese leaders have been in the past, or Mao will not sell out, and China, like Yugoslavia, will become a rebel from the Soviet camp. In either case, the Russians lose in China.

Hands-off policy in China does not mean the U. S. will not recognize the communist regime eventually. But it probably will not come for at least a year. The long series of Stalin-directed incidents culminating in the withdrawal of U. S. consular officials from the Chinese mainland were intended to forestall recognition. They succeeded.

To understand fully the U. S. moves in the Far East, you should note some important distinctions in the U. S. attitude toward those nations that rim the Chinese mainland.

In the North, the U. S. assumes direct responsibility in Japan, Southern Korea, and the Philippines. That means U. S. armed defense of Japan, if needed, pending creation of a Japanese security force; restoration of Japanese trade with North China, Southeast Asia; congressional approval of more Korean aid; and additional aid to the Philippines, accompanied by a warning that they mend their financial ways. Formosa has been abandoned despite rumblings from dissatisfied Republican congressmen.

In the South, U. S. help will go only where it is requested. Direct offers of assistance by the U. S. are out. Communist propaganda can too easily raise the cry "Yankee imperialism." However, if asked, the U. S. stands ready with technical assistance and Export-Import Bank loans to bolster any commonwealth recovery plan that may result from the Canberra talks. Similarly, the U. S. will back Dutch aid to Indonesia and French aid to Viet Nam. French troops in Indo-

Washington Report (Continued)

China stand a good chance to receive part of the $75-million in arms aid for Asia that Congress voted last session.

POINT 4 HAS A NEW DRESS. Opposition from Congress and business forced President Truman's world aid-planners to rewrite their Point-4 bill. Now private investment is stressed as the backbone of world development, whereas the original bill only talked technical assistance.

Chances are that Congress will pass this newest version without too many changes. When he does, you can look for more visits by joint technical missions like the Abbink mission to Brazil (see McG-H Digest, May '49, p26), or those the World Bank is currently sending to its member countries (see page 17).

It provides too for a central coordinating staff to check on what other U. S. and international agencies are doing in the way of aid and assistance in underdeveloped areas. Government guarantee of private investments abroad against non-business risks is still a separate bill. It will be passed, too.

MERCHANT-SHIP OPERATORS may see their U. S. competition cut down. The U. S. State Department and the National Security Resources Board (NSRB) are trying hard to convince President Truman that the U. S. does not need a merchant fleet for defense. Joint Chiefs of Staff have ruled that, at a minimum, on D-day next the U. S. should have in service 1,200 active merchantmen, plus 1,800 more ever ready in the laid-up reserve fleet.

State and NSRB would over-rule that decision. They figure any future war will be fought either on the North American continent or in Europe. In the first case, they claim the U. S. will not need any merchant ships. In the other, Allied fleets will be available. This battle will not be settled quickly. Too many people recall the last war. The U. S. had the use of Allied fleets then too, but had to build and man over 6,000 merchant vessels.

NEW U. S. INVESTMENT CAPITAL is the aim of a Brazilian proposal to set up a hard-currency fund in the U. S. to service private U. S. investment in Brazil. State Department likes the idea, but would like to know more about where the Brazilians think they are going to get the money. State is not sure Brazil can save enough out of current trade earnings.

A PRICE WAR on the world's petroleum markets does not seem likely. Washington, instead, is looking for a marketing deal between British and U. S. producers. A price war would ruin the British. And it would stir up troubles in Congress. Small domestic producers are already super-sensitive to oil imports. Two bills before Congress would restrict oil imports. They are not likely to pass, but a lower world oil price might push them through.

Announcing the entirely new

HYSTER 20

better in every way

- **NEW,** improved Wisconsin *air-cooled* engine. Efficient in *any temperature,* high or low.
- **NEW,** long life, heavy duty Borg and Beck CLUTCH. Estimated life over two times greater than other trucks. *Can be replaced in less than two hours.*
- **PNEUMATIC TIRES**—big diameter, 10-ply rating (6.00x9).
- **SINGLE LEVER CONTROL**—one lever for hoisting and tilting.
- **LOW OVERALL HEIGHT**—truck with 9-foot lift is only 78½ inches high. Other lift heights available.
- **LOW OPERATING COSTS**—almost 100 NEW mechanical improvements.

NOW ON DISPLAY AT HYSTER DISTRIBUTORS

HYSTER® COMPANY

2902-64 N. E. CLACKAMAS ST.
PORTLAND 8, OREGON, U. S. A.

...the first entirely modern 2000 pound Lift Truck

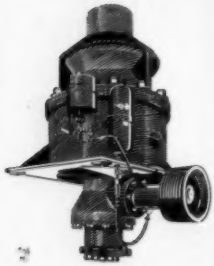
Designed by materials handling engineers. Priced right; low maintenance costs; standardized repair procedures; low depreciation. Operates equally as well inside or outside your plant. Low center of gravity; better visibility. EASIER ON FLOOR SURFACES, ON LOADS, ON THE OPERATOR.

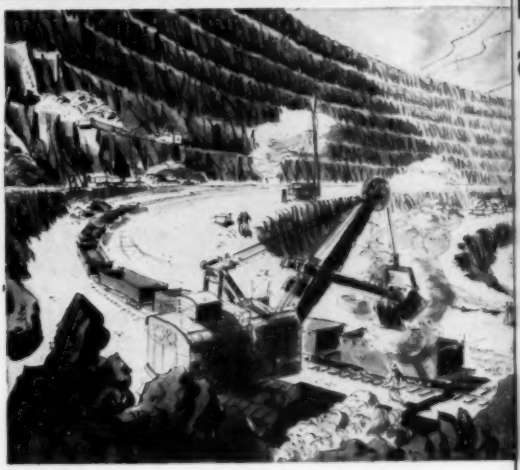
THOUSANDS of Hyster 20 trucks are in use in HUNDREDS OF INDUSTRIES. NOW the new Hyster 20 Lift Truck can cut materials handling costs even more. SEE IT at your nearest HYSTER DISTRIBUTOR. Write for literature.

ALLIS-CHALMERS

SERVING ALL INDUSTRY FOR MORE THAN A CENTURY

Machines for Mining and Processing Jobs!





ALLIS-CHALMERS makes all types of jaw, gyratory and roll-type crushers, in a wide variety of sizes and for almost any processing need.

Whatever your special operating problems, Allis-Chalmers can supply the *right* type and size machine for every processing step — including grinding mills, screens and sifters, furnaces and kilns, washing and handling equipment, coolers, dryers.

Allis-Chalmers also builds power equipment to drive these machines—electric motors, Texrope V-belt drives and sheaves, transformers, switchgear, and whole power generating plants.

Well-integrated Allis-Chalmers equipment working together, gives maximum dependability, smoothest continuous production, with *one undivided responsibility*.

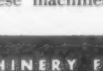
For your equipment needs, consult our representatives in your country or write—

ALLIS-CHALMERS MANUFACTURING COMPANY
General Machinery Division,
858 South 70th St., Milwaukee 1, Wis., U. S. A.

Texrope is an Allis-Chalmers Trademark.

★ ★ BASIC MACHINERY FOR THE WORLD'S MAJOR INDUSTRIES ★ ★

Electrical Equipment



Steam and Hydraulic Turbines, Condensers

Crushing, Cement and Mining Machinery

Centrifugal Pumps, Motors and Control

Flour Mills, Wood Processing Machinery

March 1950 • McGraw-Hill DIGEST • Volume 5 Number 3

The World Bank

Bridge Between Point 4 and Industrial Development

El Salvador Asks, Gets $12.5-million Grant

Though small, El Salvador has always been able to pay for its necessary imports through export profits. But paying for a hydroelectric power plant—to replace its worn and expensive diesel generating system—was more than the country could handle.

Outside help would be necessary if the country was to replace the existing facilities. Without new facilities economic growth would halt.

The U. S. Department of the Interior—and a private engineering firm—had told El Salvador that a dam on the Lempa River at Chorrera del Guayabo would produce a cheap, steady supply of 30,000 kw. power.

Not knowing how to finance the project, the country last spring took its idea and an engineering survey to the World Bank—officially the International Bank for Reconstruction and Development. The bank was interested. El Salvador hired Harza Engineering Co. to make a complete survey. By mid-summer 1949 the report was submitted.

December 14 the World Bank's mission to El Salvador had submitted its report on the country's economy and the need for the power plant. The Lempa River Hydroelectric Commission was formed. Negotiations for the bank loan were completed.

El Salvador had its $12.5-million to cover foreign-exchange costs of the power plant. The loan is a 3¼% grant to be amortized in 25 years, beginning in 1954. The bank also supplied the country with technical experts to aid in setting up the local capital market to raise $5-million needed in local currency.

DEVELOPMENT—requiring outside capital and know-how—does not have to wait for completion of President Truman's Point 4 program, or a new "Little Marshall Plan."

Even if your pet project has been turned down by private investors, you may still be able to get the backing you need. That is why International Bank for Reconstruction and Development (commonly called the World Bank) is in business.

The World Bank was created as a United Nations agency to fill the development gap between purely "Point-4 type" activities, such as technical assistance in basic health, education, and administration on the one hand, and private capital investment on the other.

If your project can meet these five requirements, odds are you can get aid:

1. Private credit is not available.
2. The project will be self liquidating, by directly earning (or saving) foreign exchange, or fostering new industries that will do the job.
3. Project engineering and economics are sound.
4. It contributes to the country's overall development, and does not take the place of something more urgently needed.
5. The project country is a bank member, politically and economically stable, or at least taking real steps towards those ends, and if the loan is for private enterprise, it must be government guaranteed.

Naturally, there is more to getting a

The following countries were visited during the past year by World Bank missions to study development projects.

Bolivia	Iraq
Brazil	Lebanon
Chile	Mexico
Colombia	Nicaragua
Costa Rica	Paraguay
Cuba	Peru
Dominican Republic	Philippines
Ecuador	Thailand
El Salvador	Turkey
Finland	United Kingdom (Colonial Div.)
Egypt	
Guatemala	Uruguay
India	Venezuela
Iran	Yugoslavia

The World Bank sent missions to the following countries in 1949 to study purely reconstruction matters.

Belgium	Luxembourg
Italy	Poland
	The Netherlands

World Bank loan than just measuring up to those five requirements. But they are the main things, the rest being primarily a matter of routine banking procedure.

Anyone can apply for bank aid—either a government, a private corporation, or a person. Members of private business asking for a loan do not have to be citizens of the country where the project is to be located. But the government of the project country has to guarantee repayment regardless.

You see a good example of this in the $75-million World Bank loan to Brazilian Traction Power & Light Co., a Canadian corporation operating in Brazil. Canadians originally made application; the government of Brazil guaranteed the loan.

You do not have to have a specific loan application in your hand to walk into the bank's offices in Washington or Paris to talk development. In fact, you do not even have to have anything definite in mind. Charting development is one of the bank's biggest jobs.

To do this the World Bank is set up to send missions to survey national economies, appraise industrial and natural resources, both actual and potential. Usually the cost of these missions is split between the band and the country under study, the bank paying dollar costs, the country footing the local currency bill.

These missions evaluate present laws and policies and recommend changes, outline general development programs, suggest which projects should get first attention, and detail how and where to get technical help and financial backing.

Report Recommends Changes

In some cases, a mission report may preclude any chance of World Bank aid until certain reforms are instituted. A case in point is the Philippines which 2 years ago applied for a power development loan. The bank deferred decision on the loan until the new republic took steps to improve internal fiscal conditions and external payments.

Specific loan applications get the full treatment, usually including a mission to study the project on site. If the bank turns the application down, it will tell you why, and, if later the project meets its requirements, will reconsider it.

Finally, if all you have is an outline idea that you do not quite know what to do with, bank officials will discuss it and advise what steps to take next.

Granting a loan does not end the bank's work. It is set up to give the necessary technical assistance and supervision during construction to see that all goes well. That includes everything from stationing a bank engineer at the project site, to, as in the case of El Salvador, supplying the technical assistance for setting up a local capital market.

The fact that your country may not now be a member of the bank does not mean you cannot get investment aid from the World Bank in the future. New

members are welcome, and the procedures of joining are relatively simple. Take the case of Thailand which some months ago found itself with development plans but no way to finance them. They joined the bank in 1949.

Interest rates and charges average around 4% and amortization runs anywhere from 2 to 30 years. Amount of the loan can include cost of pre-loan engineering studies, but if the loan is turned down, the applicant is left to pay the bill. Loans normally do not cover local-currency costs of a project.

A UN Special Agency

Technically, the World Bank is a specialized agency of the United Nations. But in practice it is an international corporation capitalized, owned, and operated by its 48 member nations.

Its objective is to guide and finance development—capital, fiscal, administrative, trade—in its member countries to a point where private capital takes over.

The bank is financed both by the original stock subscriptions of its members and by selling its bonds on the world's private capital markets. By selling bonds to private investors in the U. S. and Switzerland, it has so far raised $250-million and 17-million francs. It expects to go to the market again sometime this year, probably to raise another $100-million.

During the life of the World Bank, it has had somewhat over $1-billion available for lending. Actually, the bank has signed 17 loan agreements with 13 countries, thereby committing $744-million. Of this amount, $204-million was for development, the balance for postwar reconstruction.

The World Bank is first and last a bank; it does not indulge in the luxury of give-away programs. The U. S. once tried using its 33% vote to apply behind-the-scenes pressure on bank officers to speed up a loan approval to coincide with U. S. foreign policy moves. This proved unsuccessful. Yugoslavia is the case in point. Secretary of State Dean Acheson wanted the $25-million loan to Tito approved last December, but it is being held up until it meets bank requirements.

The bank stresses the importance of this policy in maintaining the strong position of its bonds in investment markets. Private investors are not noted for their willingness to buy into a long record of defaults. So far, the bank's record is clear.

To protect both the lender and the borrower, the World Bank maintains a constant staff of about 70 engineers, economists, attorneys, treasury experts, and loan officers. It has to date employed over 40 outside consultants, including both individuals and consutling firms. They see to it that proposals, are really bankable and that they contribute to the long-range development of the country.

Colombia Biggest Venture

The biggest venture to date is the 14-man mission now preparing its report on Colombia. Its final report will be the most detailed the bank has yet prepared, covering every phase of the Latin American country's national economy and potentialities.

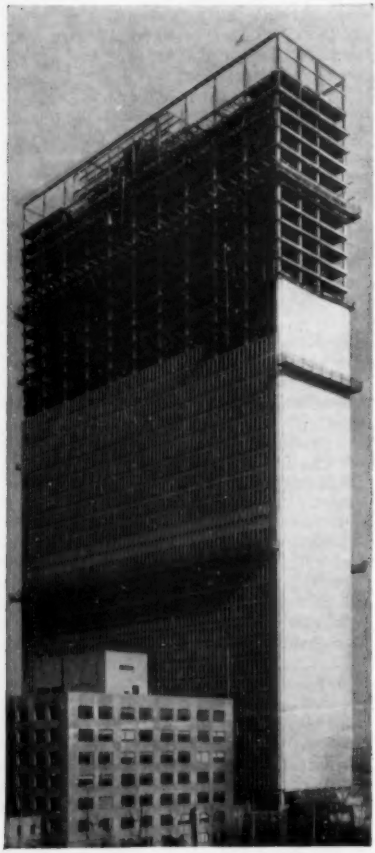
Actually the bank is as much interested in evaluating this kind of mission as it is in coming up with a solution to Colombia's long-range development problems. The success of this mission will determine whether other similar studies will be made in the future.

Admittedly, development loans have been somewhat slow in coming, and investigations often tedious, at least to the would-be borrower. But the bank points out that when it came into being, its files were virtually devoid of any information on more than two-thirds of its member countries. Each application required thorough study, not only of the specific project, but of the applicant country's general situation as well.

But now World Bank files are starting to fill, and bank officials are optimistic that in the future, action will be speedier.

World's Capitol Takes Shape

Secretariat to present interesting structural effect with ends of white marble and faces of glass and aluminum. Building abnormally thin



FUTURE HEADQUARTERS for the United Nations Secretariat is the first U. N. building to be erected.

UNITED NATION'S SECRETARIAT is the first building of the world's capitol to rise along New York City's East River. The 17-acre tract of land, given to the United Nations by John D. Rockefeller, Jr., lies at the foot of New York's famed cross-town thoroughfare 42nd St.

The 39-story Secretariat, with three basements and a penthouse, is located at the south end of the tract (see photo next page).

The thin structure, only 72 ft. deep, will be opaque on the north and south faces. Faces are unbroken stretches of white marble 500 ft. high, 72 ft. wide. The east and west faces will be transparent—windows projected 3 ft. in front of the steel frame occupying nearly all of the 280x500-ft. face.

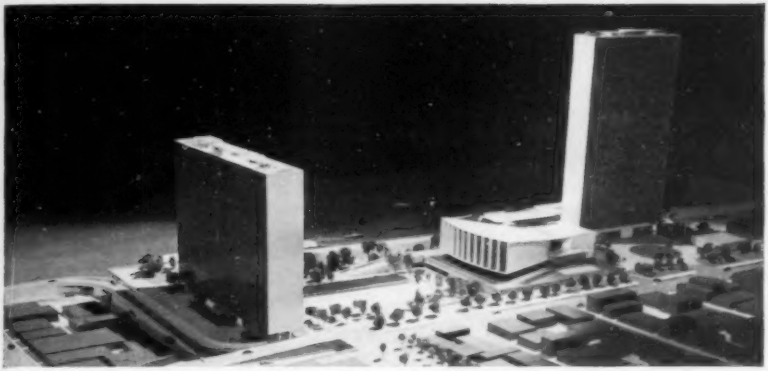
Windows Surveyed In

Each window is an integral part of a 4x12-ft. aluminum grid unit. Accuracy in erection was attained by using precise surveying methods to locate supporting brackets for frames near the edge of the floor slab, which cantilevers past the spandrel beams. Brackets were bolted to short 5-in. wide-flanged beams embedded in the floor slab at 4-ft. intervals. Stud welder secured bolts to beams, enabling bolts to be set directly on survey line.

Eight feet of the 12-ft. floor-to-floor height is taken up by double-hung, aluminum, heat-absorbing glass.

On the 6th, 16th, 28th, and 39th floors, where air-conditioning equipment and fan rooms are located, windows are 2½ ft. shorter. They are formed between continuous strips of aluminum louvers at top and bottom.

Marble face was raised into place by mobile booms, masons working from hanging scaffolds. In each story, 1½-ft. deep, 12-in. thick, bonded stones were set



ARTISTS' CONCEPTION of the United Nation's site along New York City's East River.

on floor slabs with a 5-in. overhang and anchored to spandrel beam. Then, 4-in. facing, 2-ft. 2¾-in. long by 3¼-ft. high blocks, was set. And 8-in. brick backup was placed and marble anchored to it.

Because of slenderness of the structure, wind forces are high in lower stories. Wind girders are connected to column flanges with T-shaped beam stubs top and bottom. Girders resist negative movement because they are reinforced at both ends with cover plates extending to quarter points of the span.

Floor are grit-aggregate concrete reinforced with wire mesh, except for east and west end panels which are stone concrete. Office floor structural slabs are 4-5¼ in. thick. Design live load is 50 psf. plus a partition load of 20 psf. They are topped with a 4-in. grit-aggregate fill and a cement-motor finish.—Eng News-Rec, Dec 29, p 20

Oil-Well Logging Method

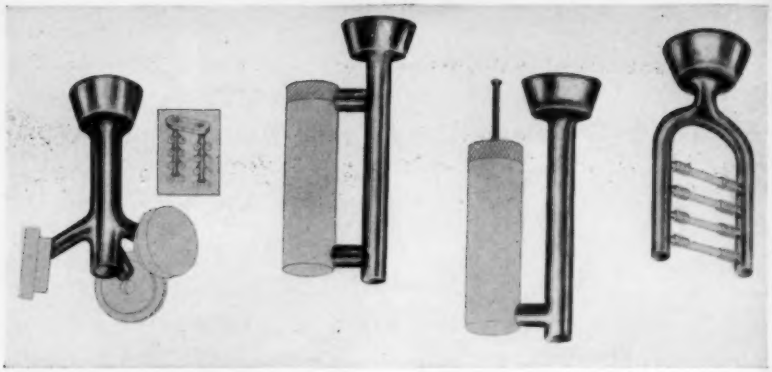
A new electric logging system, called Microlog, measures each individual pay section of a new well to a fraction of a foot. It does not supplant other logging systems, core analyses, sample examinations. Rather it provides a more precise count of pay thickness.

Developed by Schlumberger Well Surveying Corp., the new technique measures the electrical properties of very small volumes of formation near and behind the hole wall. Electrodes are held against the wall by spring action. Resulting curves are strikingly different from those of other logs.—Oil & Gas J, Dec 29, p35

Lightplane Geared Engines

Combination of fast-turning engine and slow-turning propeller—long used in transports and helicopters—is coming too for light planes. Three manufacturers are producing engines fitted with reduction gears to reduce propeller revolutions per minute. The three are Lycoming-Spencer Div., AVCO Mfg. Co.; Continental Motors Corp.; Aircooled Motors.

Major advantages of the geared over direct-drive engines are increased propeller efficiency at lower speeds, increased power and engine efficiency, and decrease in propeller noise level.—Aviation Wk, Dec 19, p16



HOW TO GATE INVESTMENT CASTINGS

Small investment castings are best made with tree-type arrangements consisting of one or more down sprues. Castings are attached to sprue by slender gates at a slight angle. Larger castings, ½ in. or more thick and 3 in. or more long, are indirect-poured at the bottom. A second gate at the top allows air to escape and supplies hot metal during solidification. Top gate may be omitted if the mold venting is adequate. This method is successful for castings up to 1½ in. thick and 6 in. long. U-type gating gives test bars that show no shrinkage in X-ray tests.—Foundry, Jan, p74

Electrostatic Paint System Pays for Itself in 4 Months

An electrostatic spray-painting system installed last August by Crosley Corp., refrigerator manufacturers, paid for itself by December. System cost $70,000.

First production runs following installation showed savings of 70¢ per refrigerator. With more experience, savings were raised to 82¢ per unit—75¢ in materials, 7¢ in labor. Company believes savings eventually will reach 90¢ each.

Primary saving is through elimination of overspraying. The high-intensity electrostatic field charges paint particles, drawing them to surface. This produces a more uniform coat. Paint "wraps around" corners, reducing need for touch-up later. System draws only 4 amp., consuming less power than a 1,000-watt lamp.

Little change in production set up was necessary to install the system. Main jobs were rearrangement of spray booths, building new reciprocators for moving spray guns, and installing the electrostatic equipment.—Factory, Jan, p95

Spots Bang's Disease

In a year or perhaps two, dairy-plant operators may be able to test for brucellosis (Bang's disease) just as they now test for butterfat.

The ring test is the reason. One drop of purple *Brucella* antigen is added to milk in a test tube. If the cream layer forms a blue ring around the top of the sample and the milk is white, the test is positive. White cream and blue milk means a negative test and no brucellosis.

Advantages of the ring test over the now-used blood test are economy and speed. Cost is one-tenth as much. And one man can check more than 50 herds a day.—Food Ind, Jan, p81

Steelmaking Furnaces Show Trends in Design, Operation

Major trend in openhearth furnaces is toward large furnaces equipped with basic ends. Basic roof construction is still in the experimental stage. Faster charging into furnaces is receiving particular attention.

Large electric furnaces are being employed for tonnage production. Side charging for heavy scrap and top charging for light scrap, as well as high power input, can increase tonnage substantially.

Blast-furnace practice is under continual study to improve fuel consumption. Two large projects are now underway for use of oxygen at tuyeres. It is believed that admission of a mixture of highly preheated carbon monoxide and hydrogen may reduce coke consumption.

Use of a reformed gas would reduce the amount of wind because of nitrogen elimination. The high temperature would be maintained in the hearth section. Reducing ability of hearth and bosh gases would increase and, in turn, thermo-value of gases would improve. Other results: lower slag volume and less sulphur transfer.—Steel, Jan 2, p224

Boiler-Slag Prevention

Experience of Narragansett Electric Co. indicates that lime coating on power boiler surfaces prevents slag formation. Surfaces are first cleaned of slag by hot-water spraying for at least 8 hr., mechanical cleaning, and then washing with alkaline water solution to neutralize all acid in metal pores.

The lime slurry is made of water and hydrated lime. Its consistency is adjusted so it can be sprayed over the metal surfaces.

Results have been good. No appreciable slag deposits built up within a year. Contrary to Narragansett's results, lime coatings for Detroit Edison Co. showed few beneficial results.—Power, Jan, p91

Convention Calendar

(Equipment Exhibited)

Apr. 10-14—American Society of Tool Engineers Exposition, Philadelphia, Pa.

Apr. 24-27—National Packaging Exposition and Conference, Chicago, Ill.

Apr. 25-26—Metal Powder Show, Book-Cadillac Hotel, Detroit, Michigan.

May 8-12—American Textile Machinery Exhibition (and Allied Industries), Atlantic City, N. J.

May 8-12—American Foundrymen's Society Convention and Exhibit, Cleveland, Ohio.

May 29-June 9—Canadian International Trade Fair, Exhibition Park, Toronto.

June 15-19—Industrial Finishing Exposition, Chicago, Ill.

June 26-30—American Society for Testing Materials Annual Meeting and Exposition, Atlantic City, N. J.

Aug. 7-19—First United States International Trade Fair, Chicago, Ill.

Aug. 14-18—National Power Show of National Association of Power Engineers, St. Louis, Mo.

Sept. 5-9—National Chemical Exposition, Chicago, Ill.

Sept. 11-15 — Instrument Society of America Conference and Exhibit, Buffalo, N. Y.

Sept. 25-27—National Electronics Conference, Chicago, Ill.

Oct. 23-27—American Society for Metals National Metal Congress and Exposition, Chicago, Ill.

Oct. 23-27—National Business Show, New York, N. Y.

To anyone interested in any of these exhibitions, either as a possible exhibitor or visitor, the McGraw-Hill Digest will be glad to furnish additional information.

Larger Turbines, Generators Expected in Power Field

A Westinghouse Electric Corp. forum on power generation and use brought out some important points on trends in these fields (also see McG-H Digest, Feb, p49). Here are a few:

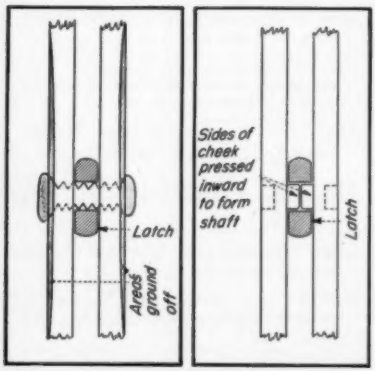
Turbine-generators of 150,000-200,000 kw. may be soon in demand. Present top limit of turbine standardization of 60,000 kw. is too small for larger systems. Standardization of a 90,000-kw. unit is indicated.

When suitable materials are developed and the thermal efficiency is justified regardless of cost, turbines may be built for 1200° F. steam at the critical pressure of 3,206 psia. These would produce 8% more kw.-hr. per ton of coal than the 1050° F., 2,000-psi. units.

A-c. generators of 3,600 rpm. and 250,000 kva. may be expected when better alloy forgings, rotor ventilation, and insulating materials are available. Single-unit 1,800-rpm. generators can now be built for ratings of 350,000 kva. Better insulation will open interesting possibilities.

D-c. motors are expected to continue in heavy demand for many years. For every job that a-c. motors take over, two jobs spring up that only d-c. motors can handle.

Major changes will include total enclosure. Induction-motor stators will be simplified—possibly by die-casting the frame around the core. Speed controls will improve; development of a superior tube-type frequency converter may challenge the commutator.—Power, Jan, p102



PRESSED-RIVET NEEDLES BEST

Pressed-rivet needles proved superior to screw-rivet needles in a 15-week test on men's half-hose machines at Adams-Millis Co. During test, 21 pressed-rivet needles were replaced because of bent latches; 61 screw-rivet needles were replaced. Screw-rivet needle (left) has a small area on each side ground away to make rivet head flush, weakening cheeks slightly. Pressed-rivet needle has sides of cheek pressed inward to form shaft on which latch rides. This feature is believed to reduce bent latches.—Textile World, Jan, p115

Cheaper Fender Fabrication

Buick automobile front fenders are now made by preforming the steel blank and welding before the draw operations. Result is substantial savings.

The blank is folded to form an irregular cone, then welded from headlamp area to cat-walk flange on the grille side. In drawing, the welded cone nests in the die so drawing need not be as deep as in the former method. The new method also eliminates wrinkling, redrawing, washing, and annealing.—Steel, Jan 2, p115

Turboprop Best on Transports

Best field for application of the turboprop engine lies in long-range planes according to Bristol Aeroplane Co.'s chief designer. There it can prove even more economical than in reciprocating engines. Combination of small size, simplicity, reduced maintenance, low vibration, and light weight simplifies engine mounting and plane's structural design.—Aviation Wk, Jan 9, p18

Plywood in Construction Today

Uses in houses and commercial buildings are expanding constantly as it goes into sheathing, subflooring, roof decking, siding, and interiors

MORE DIFFERENT BUILDING JOBS than any other material is the claim for plywood. In the 1930's it was called the "material of tomorrow" and considered a building specialty. But now plywood is established as a basic building commodity.

Its basic justification is to improve on wood. It does so by making possible larger panels that are stronger, more rigid, split proof, puncture proof, light, and dimensionally stable.

Made of different woods and in various grades, plywood can meet a wide range of demands. Fir plywood is the utility construction material for both inside and outside of buildings and for structural parts. Hardwood plywoods furnish beautiful finishes for interiors and furniture; walnuts, maples, oriental wood, and prima vera predominate, but popular too are mahogany, oak, gum, and birch.

Fir plywood is a favorite material for house sheathing, subflooring, and roof decking. Tests show that plywood imparts more than double the rigidity and strength of diagonal wood sheathing. Also, use of panels from 32 to 48 sq. ft. can mean savings up to 50% in time over conventional methods.

The correct grade and thickness give maximum economy and structural strength. Minimum thicknesses of plywood for wall sheating are $\frac{5}{16}$-in. for 16-in. stud spacing and $\frac{3}{8}$ in. for 24-in. stud spacing.

A $\frac{5}{16}$-or $\frac{3}{8}$-in. plywood subfloor with joists 16 in. on center is adequate when finish flooring is $\frac{3}{4}$ in. More popular though are $\frac{1}{2}$- and $\frac{5}{8}$-in. subfloors.

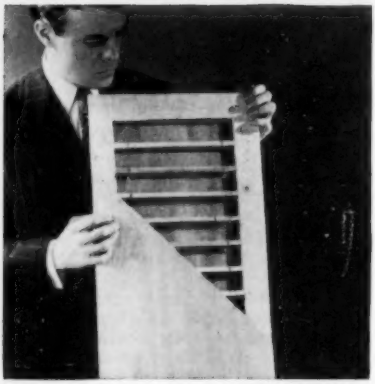
Plywood has been found to be an excellent backing for other wall panel materials that require a smooth, solid backing. Areas exposed to water call for exterior grades of plywood with their waterproof adhesive bond.

Architects and builders are more and more realizing that unusual and pleasing effects on house and small commercial building exteriors are possible with plywood. Permanent outdoor exposure requires exterior grades.

Plywood panels intended for siding may be applied horizontally or vertically with molded battens, V-grooves, or flush

FOR LESS FATIGUE

Transfer carriages at Caterpillar Tractor Co.'s new engine plant allow easy movement of crankshaft racks. Little effort is needed to move them from floor-mounted roller conveyor to short conveyor holding stations at each machine. Racks are designed so each level can be removed to uncover crankshafts in lower levels.—Am Mach, Dec 29, p58



NO-WARP DOOR

Cupboard door, made by Wisconsin Laminating Co., has hardwood plywood facings bonded to a rim of low-density wood that is relatively inert and less subject to warp and twist. Bond is made with Bakelite urea liquid resin glue. Door is warranted to stay flat under normal conditions.—Chem Eng, Jan, p162

joints. Minimum thickness recommended is ⅜ in. Single-wall structures, such as warehouses, have been made successfully with ½-in. or thicker siding.

Exterior siding should be applied with non-corrosive nails of the hot-dipped galvanized type. Nailing should be done with 6d common or with 6d box nails for ⅜-in. siding and 8d for thicker siding. For 4x8-ft. panels, nails should be spaced 6 in. at edges and 12 in. elsewhere.

All edges of plywood siding, whether butted, veed, covered, or exposed, should be bedded in a thick lead-and-oil paste or other suitable compound. This is knifed on as panels are applied. Final finish on siding should be three coats of paint.

The increasing popularity of dry-wall construction focuses attention on plywood for interiors. Wall paneling thicknesses are ⅜ and ¼ in., while ½-, ⅝-, and ¾-in. thicknesses have widespread use in cabinets, built-ins, and doors.

Joints between panels can be finished so as to add to the architectural effect. Panel edges can be butted flush, V-grooved, covered with decorative moldings, or have inset moldings. Finishing interiors with plywood permits curved surfaces where desired.

In general construction work, plywood is a universally popular material for concrete forms. Correct grades must be selected to get good wear. The new plastic-surfaced plywoods are giving outstanding success where the concrete surface requires the best possible appearance.—Am Builder, Jan, p69

Ceramic Boosts Ultrasonics

Barium-titanate, a new ceramic material, overcomes disadvantages imposed by quartz crystals in industrial applications of ultrasonics. The cheap ceramic used as the transducing element will make pilot-plant and commercial-scale use of ultrasonics economical. Its use as a transducer was a development of Brush Development Co.

The new material is cheaper than quartz crystals and can be made in large sizes, or several pieces can be used together. It requires less voltage to produce equal vibrations. A pilot-plant can operate on 115–230 volts and consume 3,000 watts.

Barium-titanate transducers can be formed into any shape, depending on the desired focus of the vibrations required. —Textile World, Jan, p90

Group Bonuses Up Output

Moore Business Forms, Inc., dropped its individual wage-incentive plan and adopted a group incentive system. Handling thousands of custom-made orders each month made individual system difficult to apply fairly. Accurate time and production checks were difficult to determine. The new group incentive has raised production 31%.—Factory, Jan, p109

Nash Nixes NXI Now; Would Import Assemblies

Nash Motors Div., Nash-Kelvinator Corp. is showing its Nash-Experimental-International (NXI)) prototype automobile which the company believes can be sold for $1,000. Market reaction will determine whether it is to be produced or not.

To market the car at that price, Nash would import its power plant, transmission, axles, and other expensive mechanical parts. Front end, integrated grille-and-bumper, lights, and fenders would be a single unit. Trunk door would be eliminated, baggage being stored behind rear seat.

Nash could use the 18-hp. Fiat engine used to power the prototype, the Fiat 36-hp. engine, or the 36-hp. British Standard.—Business Wk, Jan 7, p25

Tiny Turbine Ready to Market

Boeing Aircraft Co.'s model "502" lightweight turbine is ready for commercial use. The tiny, 185-lb. turbine (see McG-H Digest, Oct '47, p42) develops 165 hp. on continuous rating and 200 hp. for emergency use. Delivered horsepower is flexible despite fact that unit runs at a constant speed. This is possible because there is no solid connection between chambers and turbine—hot gases are the only link.

Unit has only one-sixth the parts of a reciprocating engine. Boeing believes the turbine will find application in automobiles, trucks, boats, and on industrial jobs.—Business Wk, Jan 14, p70

New Paint-Spraying Process

Spray-applied protective coatings on metal last up to 15 yr. with a new paint-spraying process developed by A. B. Antros, Sweden. Acetylene blowers on gun serve two purposes—to dry surface and speed drying of paint. Paint can be applied under all weather conditions at speeds up to 375 sq. ft. per hr.

Advantages of the process: coating is not weakened by addition of thinners, rust protective raw materials can be used that cannot otherwise be used with organic solvents, paint penetrates pores of the metal being coated.—Cons Meth & Equip, Jan, p90

Too Much Steel for Europe?

Europe's steel production plant is expanding so rapidly that it may be making 7.7-million net tons more than it can use or export in 1953. That is the conclusion of the Steel Division of the UN Economic Commission for Europe.

Estimated annual production for Europe (outside Russia) may total 70.7-million tons of ingots and castings by that time. Output last year was 58.1million tons. New plants are being built, old plants improved.

The ECE Steel Division estimates that Europe can consume only 58.5-million tons by 1953 and export only 4.5-million tons. It recommends that the steel investment and production programs be restudied and the world market situation be more closely analyzed. It does not recommend a return to cartels.—Steel, Jan 9, p27

World Oil Production

Crude-oil production outside the U. S. (excluding Russia and her satellites) rose 10.2% in 1949 over the preceding year (see McG-H Digest, Mar '49, p15). Daily average during last year was 3,433,000 bbl.

This record volume is due principally to increases made in the Middle East. Production in Persian Gulf area was up more than 20%, while that in Venezuela declined sligthly (about 1%). Available data from Russia and Eastern Europe indicate a gain there of 10% over '49 for a daily average of 803,100 bbl.—Oil & Gas J, Dec 22, p177

2-for-1 Twister Features Upstroke and Downstroke

New 2-for-1 twister, developed by Howe Machinery Corp. in cooperation with American Viscose Corp., does up-twisting, plying, and down-twisting. Unit consists of two up-twisting spindles and a down-twisting spindle. It is expected to be useful in tire-cord production, twisting glass fibers, nylon, and cotton.

Up-twisting spindles run at 7,200 rpm., each inserting 14,400 turns per min. Down-twisting spindle for plying or cabling runs up to 7,200 rpm.

Down-twister is unique. The two ends from the up-twister are delivered to a rotating guide above spindle. Ends enter rotating plate below package, thread up through spindle center, emerging at top where they pass through feeding mechanism coupled to spindle. They then run through a traversing mechanism similar to a fishing reel level-wind. Resulting double-headed package holds 10 lb. and is driven at yarn speed, by magnetic clutch, to wind on finished yarn.—Textile World, Jan, p123

DIVING TOWER WELDED

Houston's fabulous Shamrock Hotel cherishes this 5- and 10-meter diving tower. Center shaft is 24-in. dia. tube of ½-in. wall thickness and 37¾ ft. high. Butt welded to shaft are cantilever platform supports of 12-in., 20.7-lb. channels, split and tapered to 6 in. at outboard ends. Cast-aluminum stair treads are stud-bolted to shaft. All steel parts are metallized with aluminum.—Weld Eng, Jan, p55

Improves Photo-Grid Method

Behavior of sheet metal during forming —elongation and plastic deformation— is readily studied by using a grid technique. The U. S. National Bureau of Standards has developed an improved photo-grid with spacings of 0.25 mm.

A master grid was prepared by ruling a grid in wax on glass plate, etching lines, and filling in with lead sulphide. The negative obtained from the master grid by contact printing has a grid spacing of ± 1% of the nominal value in the middle portion.

Specimens are prepared by cleaning with alcohol, coating with cold top enamel, and spinning on a whirler until the enamel is dry. Sensitized specimens are then printed in contact with the film negative in a vacuum frame and developed by immersion in cold top developer. —Aviation Wk, Dec 26, p18

Money-Saving Ideas

These ideas have saved money for automobile makers:

- Reduced leaks in compressed-air piping—$100,000 a year.
- Small-tool testing and research to increase tool life as much as 825%—$191,000 last year on only one type of tool.
- Changing from rubber gloves at $1.14 a pair and lasting 1 day to plastic gloves costing $0.88 and lasting 3 days —$71,703 a year.
- Control system on work gloves—cutting monthly glove cost from $20,000 to $14,000.—Am Mach, Jan 9, p149

Automatic Hard Facing Aids Quality, Cuts Costs

Advantages of automatic hard facing, compared with hand torch practice, are: (1) lower costs, (2) more uniform product, and (3) fewer pits and voids in facings.

Applications are growing in number. One experimental machine at Haynes Stellite Co. hard-faces paper-pulp chipper knives, oil-expeller barrel bars, ensilage cutter knives, and ledger blades used in cloth cutting.

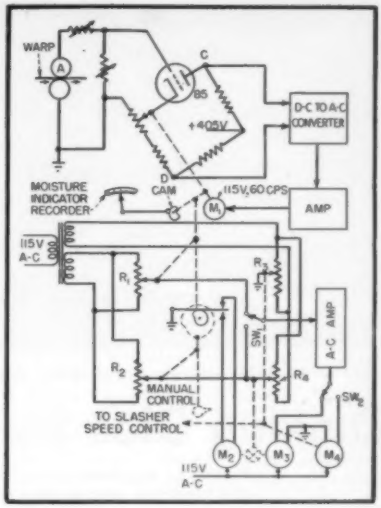
The unit has a 12-ft. track for moving the special multiple-flame preheating and welding heads along the work surface. Rods of hard-facing material are gravity fed vertically through guides mounted on the heads. The welding head oscillates slightly. This oscillation aids in uniform distribution of the alloy.

Chipper knives can be hard-faced with No. 6 Stellite alloy in 16 min. welding time. Three rods are fed through the head to produce a deposit 2 in. wide, $\frac{1}{8}$ in. deep, and 24 in. long.—Am Mach, Dec 29, p87

Clear Land for $85 per Acre

R. C. LeTourneau, Inc., cleared 930 acres of hardwood marshland in 70 days at a cost of $85 per acre by using two electric saws and specially-rigged bulldozers. Land averaged 150 trees to the acre, trees being 15–30 in. dia. A saw and 'dozer worked as a team.

A Tournasaw was trailed behind a C-11 Tournapull, all saw operations being controlled from the cab. The 66-in. circular cutoff blade could be turned from vertical to horizontal. A 25-ft. boom, mounted to the bulldozer blade, hooked into the tree, keeping saw from binding and guiding fall of tree. By keeping the saw working at full capacity and keeping trees out of the path of advance, team felled 4-5 trees per min. —Cons Meth & Equip, Jan, p62



***ELECTRONIC UNIT**, operating on electrical resistance changes from moisture variations, controls . . .*

Textile Moisture Content

Correct moisture content in warp threads enables them to withstand the flexing and abrasion in weaving. It is determined by the speed at which they pass over the steam-heated rolls of the slasher.

An electronic control made by Barber-Colman Co. measures and records moisture content and automatically adjusts slasher speed. Variations in moisture content changes resistance of circuit through detector rolls, alters tube resistance, produces d-c. potential across *CD*.

Potential is converted to ac., amplified, and fed to motor M_1. This motor actuates indicator pen arm to record moisture content and causes resistance R_1 to bring about a change in slasher speed.

To eliminate hunting, full proportioning speed control is provided by lower half of circuit.—Electronics, Jan. p138

MECHANICAL-PRESS setup for dinking dies is simple. Parts have nearly 100% cut edge when . . .

Dinking Dies Blank Metal Parts

Blanking aluminum-alloy or stainless-steel parts with dinking dies cuts blanking costs as dies are cheap, quick to make, and easy to set up

THE PRINTER'S steel cutting rule, or dinking, die is cutting aluminum alloys and stainless steels at Boeing Airplane Co. It is cutting blanking costs too.

The cutting rule works like a cookie cutter. Many industries have applied it to many uses—cutting celluloid, corrugated box stock, rawhide, linoleum, fiber, wallboard, leather, and even wood.

Boeing had to change the cutting rule to adapt the technique to sheetmetal blanking. The rule, instead of being used soft, is heated for 5 min. in a salt bath at 1450° F., quenched in oil, and drawn for 15 min. at 375° F. to 60 Rockwell C.

Making a steel cutting rule die is easy. A pattern of the blank is laid out on a ¾-in. plywood board and jigsaw-cut with a blade the exact width of the steel rule. At the corners of odd-shaped patterns, saw cuts are run out about ¾-in.

Pieces of rule steel are bent on a bending and forming machine to fit precisely into the sawed pattern. The corner extensions make sure that there will be no dimpling and that the part will be cut out cleanly.

After being shaped, the rule pieces are hardened and fitted into the pattern so cutting edges extend about 0.2 in. above the wood surface. Neoprene cork of this thickness is glued along the inner cutting edges to serve as a push-out for blanked parts.

Using a dinking die in any mechanical press is simple. The die is laid face up on a flat steel block on the press bed. Steel spacing bars are fastened at each end of the bar to the exact height of the die. On the press ram is placed another flat block. Raw stock is laid on the die, and the press is then tripped to blank the part.

The dinking-die system has several advantages in cutting aluminum-alloy and stainless-steel stock up to 0.040 in. thick. No time is required for die alignment in the press. Setup time is practically nothing. As the rule cuts all the way through the stock, the burr is small—only 0.002

Blanking Cost Comparisons (per part)

For 500 parts, 12x15 in.	
Dinking die	$0.16
Routing	0.31
Press plate	0.43
Blanking die	0.90
For 2,500 parts, 5x5 in., U-shaped	
Dinking die	0.05
Routing	0.13
Press plate	0.08
Blanking die	0.12
For 100 parts, 20x26 in.	
Dinking die	1.08
Routing	1.21
Press plate	3.10
Blanking die	6.38

in. Dies are quickly made; they take about one-fifth as long as standard blanking dies.

Blanking costs on small runs have been drastically lowered at Boeing over the past several months that dinking dies have been used. Nearly 300 such dies have now been made and used successfully.—Iron Age, Jan 12, p51

Quicker, Easier Sanitation

Top sanitation is the object at Loft Candy Co. A vital factor in obtaining it has been the redesign of equipment so it is quickly dismantled and reassembled, thus speeding cleanups.

A feature of the new equipment is that no special tools are needed. To remove a valve, for example, all a worker has to do is to disassemble the value collar and the head of the valve and then remove a nut holding the pin that fits into the head.

Caramel cooling tables are easily cleaned. The side bars can be lifted so candy residues may be scraped away.

Chocolate tempering kettles also show redesign improvements. Valves, agitators, agitator shafts, and scraper blades are removable. All corners in the tank are rounded, and all parts quickly accessible for sanitizing.—Food Ind, Jan, p46

Materials Hold Major Interest at Chemical Show

Plastics, ceramics, alloys, and the new metal-ceramics were attention getters at the recent National Exposition of Chemical Industries held in New York. Developments in these construction materials were far more striking than those in new equipment.

Teflon, a Du Pont plastic, made its first appearance as a lining material in Schutte & Koerting's lined ejector and on Knapp Mill's flat-coated panels. National Carbon showed a Karbate centrifugal pump with a seal based on Teflon. Pfaudler Co. featured Teflon gaskets and an all-Teflon expansion joint.

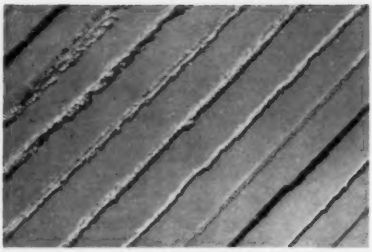
Other plastic developments: Kel-F diaphragm on a proportioning pump, armoring stoneware and porcelain with glass tape and plastic coating, polyethylene diaphragm on valve for sulphuric-acid service.

Chemical porcelain is growing in popularity. General Ceramics showed a 750-gal. porcelain vessel—the largest ever produced in a single piece.

Not many new alloys were exhibited, but older types are being more widely used. A new steel by Lebanon Steel Foundry was announced for service from −423° to 1150°F. It is a 19.5% Cr, 9% Ni steel intended for liquid-oxygen and jet-engine applications. The new Inconel X of International Nickel is intended for high-temperature service; a 15% Cr, 18% Ni alloy, it has a rupture stress of 18,000 psi. at 1500° F.

Metal-ceramics, or cermets, were shown by Haynes Stellite Co. Known as Metamic Types LT-1 and LT-2, these crossbreeds of metal and pure oxide ceramics have intermediate properties.

Dull gray or black as produced and metallic after grinding, cermets are relatively strong but brittle and sensitive to thermal shock. Present size limit is 2 in. in dia. and 18 in. long.—Chem Eng, Jan, p114



SAMPLES OF NOVELTY YARNS made with filament yarns. Spun yarns can be used in core but not in effect. Most yarns were knit on 14-gage, 2-bar tricot machines. Finer yarns were knit on a 28-gage machine.

Develop Novelty Yarns Using Tricot Machine

A unique method for producing a wide range of novelty yarns has been developed by researchers of American Viscose Corp. while studying tricot machines. While developing ribbon design, it was discovered that tricot fabric would split down individual wales. Fabrics were called "zipknits" and process called "unzipping."

This fabric can be used as warps in looms. Fabric is not unzipped until it is mounted on the loom and ready to pass through drop wires. Normally, after a fancy-knit tricot fabric is knit, it is dyed before unzipping. A machine has been developed to unzip the material at speeds up to 80 yd. per min.

After unzipping, yarns can be twisted or plied. Twisting gives yarn a full, round appearance. Novelty yarns can be made from fibers that can be cross-dyed —such as viscose and acetate rayon.

Loop-type yarns can give terry effects in woven or knitted fabrics. They will not compete with terry loomcloths.

Designing and producing warp-knit yarns is still in development. Cost comparisons with fancy yarns have not been made.—Textile World, Jan, p83

Tips From Top Welding Men Help Weldors Do Better Jobs

Visitors to the 30th annual meeting of the American Welding Society gained a great deal of rich information on how to turn out better welding jobs. Here are a few of the tips:

Using two automatic feeds on one head doubles efficiency in automatic electric hard-facing. The arc (under the flux) is between the two electrodes, which are connected in series. Penetration is better than with conventional single-electrode head, and dilution of hard-facing alloy with parent metal is small.

The submerged-arc process offers the best potentialities for sound joints in welding molybdenum. Welds proved most satisfactory when nickel, iron, or cobalt were added to the flux.

Deposition costs depend on electrode size. Cost for depositing 1 lb. of weld metal is about $4.50 with $\frac{1}{8}$-in. electrodes, $3.60 with $\frac{5}{32}$ in., $3 with $\frac{3}{16}$ in., $1.60 with $\frac{1}{4}$ in., $1.20 with $\frac{5}{16}$ in., and only $0.50 with automatic submerged-arc process.

Inert-gas metal-arc welding with consumable electrodes was originally developed for aluminum. It now is being applied to stainless steel, aluminum bronze, and other alloys and also to overlay other metals on mild steel.—Weld Eng, Dec, p17

Sprays Paint With Steam

A method to spray organic finishes with superheated steam instead of air has been developed by E. I. du Pont de Nemours & Co., Inc. Simultaneous heating and atomizing of the paint at the gun nozzle eliminates need for preheating the paint. Higher heat permits spraying at higher viscosities and higher solids, thus allowing reduction of volatile material content and producing much faster coverage.—Iron Age, Dec 15, p95

Nodular-Iron Properties Important to Foundrymen

At the recent New York State Regional Foundry Conference, a panel discussion on nodular iron brought out these important points:

Combined carbon in nodular iron varies with cooling conditions. It is 0.30–0.40% as-cast, 0.85% normalized, and below 0.30% with normal annealing.

Nodular iron is superior to gray cast iron in static and dynamic tests. It can be made by adding both cerium and magnesium, but magnesium alone is cheaper.

Basic irons should have below 0.05% phosphorous to obtain high ductility in as-cast iron, although good properties have been obtained with as much as 0.06% phosphorous.

Corrosion resistance depends on use of the casting. Nodular iron acts like steel in this respect.

Gray cast iron stands greater heat shock, as in railroad brake shoes, because flake graphite acts as a cushion. There seems to be little difference in pinholing in thin sections of nodular-graphite and flake-graphite irons. Some foundry practices, such as pouring temperatures and facings, apply for both irons.—Foundry, Jan, p102

Analyzes Ductile Cast Iron

Growing popularity of ductile, or nodular, cast iron has focused attention on analysis methods. Residual magnesium retained in the iron is critical. If too low, some graphite is formed into flakes. If too high, excessive carbon compounds are the result.

Spectrographic analysis is satisfactory if certain precautions are observed. An examination of the magnesium spectra reveals no major lines without iron interference. The maximum dispersion available and the selection of excitation source parameters to suppress coincident weak iron lines are necessary to correct spectrographically for iron contamination.

For cast iron sampled by the pin technique, minimum sensitivity is 0.009% magnesium. This is below the threshold value of effective residual magnesium concentration.—Iron Age, Dec 22, p73

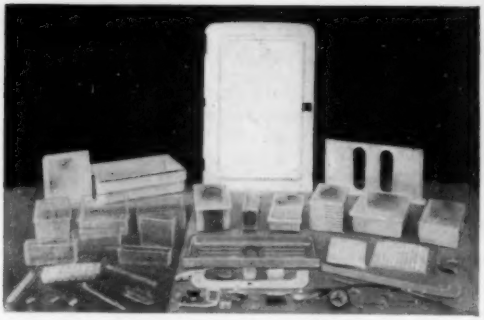
Light Loses a Customer

Utilities lose pig growers as potential customers as a result of experiments conducted by Universities of Illinois and Minnesota. Pigs do not need light to get fat. Those in electrically illuminated feeding pens daily from 10–11 pm and 3–4 am gained weight no faster than those in darkness from sundown to sunrise.—Elec World, Jan 9, p3

HERMETIC SEAL REUSABLE

Hermetically sealing metal closure can be readily opened and resealed to prevent food spoilage. Made by Jansen Container Co., device needs no opener or keys. To close, inner cap is slipped over opening and outer ring pressed over inner cap.—Food Ind, Jan, p119

BORG-WARNER CORP., in 1935, used 1 lb. of plastics in these parts for its refrigerator



FIFTEEN YEARS LATER the Norge model was consuming 12 lb. in the comparable model. In 1949, 5-million lb. were used in refrigerators. This shows how . . .

Plastics Find New Applications

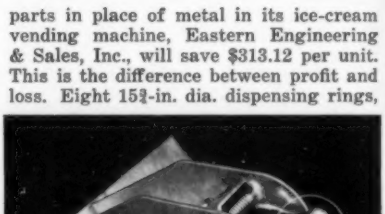
Plastics, by physical characteristics, can be used in manufacturing where other materials will not suffice. Usefulness of equipment improved

PLASTIC USE GREW RAPIDLY in the past year. Each year plastics go in to more and more products in greater and greater amounts. The following examples are but a cross-section of thousands of applications in which plastics have served to produce more goods, lower cost goods, better quality goods, goods that could never been made without plastics.

Examples of the application of plastics can be found in every industry. As a material, plastic was selected because it could improve function, give greater durability, lower production and maintenance costs, enhance stability, enlarge service, or increase value.

Refrigerators—Avco Mfg. Corp.'s 1950 refrigerators will have 68 plastic parts weighing a total of 24 lb. Company states that plastic parts are cheaper than the material replaced but that improved performance and appearance are more important. Plastics can satisfy mechanical requirements exceptionally well.

Vending Machines — Using phenolic parts in place of metal in its ice-cream vending machine, Eastern Engineering & Sales, Inc., will save $313.12 per unit. This is the difference between profit and loss. Eight 15⅝-in. dia. dispensing rings,



LOCK MECHANISMS in refrigerator doors take punishment, need lubrication. Winters & Crampton Corp. replaced stainless-steel bolt rollers with this nylon one (circle)—which needs no lubrication. It costs 15-35% less than former roller.

MINIATURE 16-mm., magazine-loading camera sells for $5 because structural parts are made of molded polystyrene. Made by Wm. R. Whittaker Co., Ltd., camera is 2⅛x2½x1⅜ in. It has a fixed-focus lens, a shutter speed of 1/50 sec.

MINER'S SHOE TOE is capped with polyvinyl plastic, replacing steel cap. A 0.0120-in. cap withstands an impact of 150 lb. After 15 mo., shoes remain in serviceable condition. Shoe costs a bit more than steel-toed shoes but lasts longer.

previously made of metal, are molded of Bakelite phenolic, saving $38 per ring.

Bread Rollers—Bread dough sticks to rollers of bread-molding machines, requiring that the machines be shut down periodically and rollers dusted with flour. Steckelber & Sons, Inc., has coated its rollers with Teflon (tetrafluoroethylene), saving $20 per day in shut downs. Dough is thinner, product is more uniform.

Laminates for Jigs—English manufacturers make wide use of high-pressure phenolic laminates for jigs. Material is easy to fabricate, can be tapped, drilled, turned, or sawed, and can be worked with woodworking tools. Weighing one-sixth as much as steel, jigs can be handled easily by women.

Water Valves—To cut production costs, Reavell & Co., England, redesigned its water valve so it could be made of phenolic instead of gunmetal castings. The housing is 4¼ in. over-all dia. and 5¾ in. deep. It is made of four water-resistant-grade phenolic compression moldings. Plastic has reduced machining by 24 hr., saved $11.20 per valve.

***TENITE II** cellulose acetate butyrate traffic marking disks are replacing painted street marking lines in Pendleton, Ore. Disks are 4½ in. dia., white or yellow in color. They can be affixed to asphalt or concrete by hot mastic and a bolt through countersunk center. Life is 4-6 yr.*

Home Furnishings—The use of vinyl-chloride acetate and vinyl chloride in the manufacture of printed window drapes was a big development for plastics last year. There is a market potential of 500-million yd. Fine "hand," softness, stability, and looks of the vinyl curtains and their cost of less than $5 per pair promise expansion in their use.

Window Shades — Vinylite window shades, introduced by Charles W. Breneman, are unaffected by moisture, mildew, and sunlight. They do not crack or strain and are easily washed.

Tableware—About 80% of the alpha-filled melamine plastic produced by American Cyanamid Co. is going into plastic tableware. Melamine tableware stacks uniformly. It is less fragile and

less costly than chinaware or earthenware, one-third as heavy as standard ware, available in brilliant colors, odorless, and non-toxic.

Display Signs—Acrylic-faced signs are replacing neon-tubed display signs in the U. S. Plexiglas sheets, $\frac{1}{8}$ to $\frac{1}{4}$ in. thick, are painted with special acrylic paints. They are illuminated by fluorescent tubes within the sign. Initial, installation, and maintenance costs are below those of porcelain-enamel neon signs. Power requirements for illumination are lower.

Automobile Uses—In 1941 the 3,800,000 cars produced in the U. S. consumed an average of 7½ lb. of plastics each. In 1949, with a production in excess of 5-million, the average rose to 14 lb. Steering wheels are the largest single user, cellulose butyrate being the preferred material. Cellulose acetate and cellulose butyrate are used in quantity for knobs, glove-compartment doors, instrument-panel details, hood ornaments, lenses for tail and parking lights.—Mod Plastics, Dec, p105

FINISHES OFF BEHIND TRENCHER

This 42-in. blade bulldozer follows trencher in excavating for the 34-in. gas pipeline being laid by Pacific Gas & Electric Co. 'Dozer breaks up large clods, rims and levels bottom prior to pipe laying. It is also used in some backfill work. Cage-cab protects driver, eliminating shoring, otherwise required by California state safety laws.—Cons Meth & Equip, Jan, p40

New Audio Trends Include Tape Recording, New Records

Recent refinements in magnetic tape recording and playback is causing the motion-picture industry to turn to it for master recordings of the sound accompaniment to a film. This was clearly evident at the Audio Engineering Society's first convention held in New York City.

Three different methods of insuring playback in precise synchronism with movie film were exhibited. Each requires something on the tape, in addition to sound tracks, that will control playback speed to compensate for changes in power-line frequency and tape length.

Another demonstration at the convention was of 78-rpm. records playing back frequencies up to 20,000 cycles. The V-groove recording stylus has two or more polished facets along the cutting edge, each of 0.1 mil.

As facets are small, they allow cutting stylus to trace high-frequency patterns while still polishing groove walls. Resulting grooves permit going up to 20,000 cps. without excessive noise modulation or objectionable distortion. The new records can be played back with either a 1.0-mil. or 2.5-mil radius stylus.—Electronics, Jan, p68

Heater for Parking Lots

A parking lot heater, designed to keep 10 vehicles warm, has been developed by Tropic-Aire Inc. Hot-water heater—the type used on railroads—is used to generate 250,000 Btu. per hr. to maintain water at 125-150° F. Water passes into a supply manifold with 10 outlets. Manifold pressure is maintained at 12-15 lb. by a positive displacement pump.

Manifold outlets have hose attachments with Y-shaped self-sealing coupling for attachment of vehicle. One Y is attached to radiator and surge tank, other to block.—Bus Trans, Dec, p124

Tricky Welding Techniques Save Time and Money

Short cuts and special techniques in operation of resistance-welding machines can save money and time. A useful one is to make two spot welds instead of one by mounting two tips. Their holder must equalize pressure and current.

With portable gun-type welders, dual weld switches permit them to operate from a single transformer and one set of welding controls and also provide a choice of weld time settings. A similar arrangement can be applied to a standard press welder by two foot switches.

Some metals require less welding pressure than ordinarily applied. An easy way to overcome this trouble is to feed air at reduced pressure. Another is to admit air to underside of ram.

When power is limited and there is capacity to operate only one machine, several machines may still be connected. To keep power demand within limits, machines are interlocked to permit only one firing circuit to operate at one time. Interlocking relay system slows up machine operation only slightly.—Am Mach, Jan 9, p96

How To Cut Assembly Costs

Time and cost of assembling mechanical components depends on the design. Too often the better the job the design does in reducing amount of material and fabrication expense of a product, the bigger the assembly cost is in proportion to the total cost.

Extensive savings are available by designing for simplified assembly. The designer should (1) use the smallest possible number of parts, (2) standardize them, (3) maintain ample clearances for loose assembly, (4) use subassemblies, (5) design for optimum handling size, (6) eliminate every possibility of wrong assembly, and (7) relate design to assembly method.—Prod Eng, Jan, p126

ELECTRIC ROTARY SNOW PLOW

Chicago, Burlington & Quincy Railroad designed and built this electric snow plow, utilizing the undercarriage, trucks, rotor, and rotor chute of an old steam plow and new cab, body, mechanical and electric parts. Plow will give quiet, smooth operation over long distances and periods. Rotor blade is 11½ ft. long and is driven by four traction motors. Larger amount of power and more uniform torque to rotor shaft will make snow and ice removal easier than with former plows.—Railway Age, Jan 14, p26

Prevent Tower Fogging

Water cooling towers often fog during winter weather. As warm, nearly saturated air leaves a tower, it mixes with surrounding air and cools, thereby condensing vapor and forming fog. In certain areas, the fog can be troublesome.

To prevent fog, (1) maintain low air temperature (70° F. or less) at tower outlet, (2) put as much air through tower as operating conditions allow, (3) maintain high exit air velocity from tower, and (4) keep minimum ice formation on louvers for continuous maximum air entering tower.—Oper Eng, Jan, p36

Technical Shorts

Accidents Rise in Summer—U. S. disabling-injury figures for 1949 show injury rate rises during the hot months—May, June, July, and August. Reasons: hazardous jobs increase in these months; hot weather listlessness and slacking off of safety precautions. The 1949 rate set a new low of 14.1 disabling injuries per million man-hr. worked.—Business Wk, Jan 14, p92

Makes Harrow Teeth—Welding in-reverse simplifies making teeth for farm harrows. A 12-in. bar is gripped in welder terminals, heated red hot by current, then pulled apart by air cylinders. Two narrow points are formed.—Prod Eng, Jan, p5

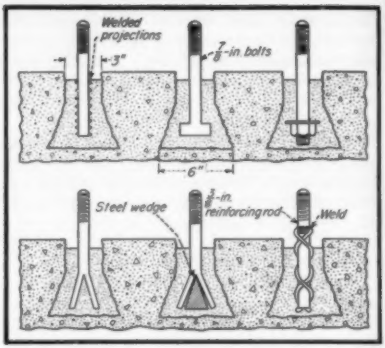
How To Keep Potatoes—Potatoes in storage use oxygen and give off moisture, heat, and carbon dioxide, much the same as human beings. They do it faster at high temperatures. So an Idaho potato grower has air-conditioned his storage house to reduce spoilage and sprouting.—Elec West, Dec, p75

Shop Reading Table—Gulf Oil maintains a library table in its machine shop. Comfortable chairs and a good supply of metalworking magazines are provided for noon-hour reading.—Factory, Jan, p107

Cut Tamping Costs—In 1947 the New York Central Railroad placed 25 Pullman-Standard power ballasters in service. In the intervening time, all machines have paid for themselves through direct savings in labor.—Railway Engrg & Maint, Jan, p42

Internal Shotblasting—A recent patent for Vauxhall Motors, Ltd., is on a shotblasting unit for internal bores and cavities. Secondary air blast from separate nozzle deflects shot at right angles to main air stream.—Mach, Dec 31, p1295

Stainless-steel Demand—Manufacturers are relying on architectural applications to increase demand this year. One steel man thinks architectural potential equals the entire present demand for stainless steels.—Iron Age, Jan 5, p11



GROUTS INTO OLD CONCRETE

Here are six practical ways to grout foundation bolts into old concrete. Holes are drilled 12 in. deep and with slanting walls to 3-in. top dia. Bolts are grouted with water mixture of 2 parts sand and one part cement. After 1-wk. set, cement should stand 2,000-psi. crushing strength.—Power, Jan, p79

Isotopes in Pipe Lines—Sharp separation of oil products in pipe lines can be accomplished by marking the interface between the two different streams with radioactive barium. Automatic switching is possible with radiation detector and electronic controls.—Oil & Gas J, Dec 22, p124

Traces Metal Atoms—General Electric Research Laboratory measures atom movement in metals by radioactivity. Radioactive isotope silver-110 was electroplated on a block of ordinary silver, and movement of tagged atoms into silver block checked at various levels by Geiger counter.—Electronics, Jan, p174

Figures Aircraft Load—Civil aviation department of India has announced an electrical computer to determine a plane's center of gravity without use of slide rules and charts. Instrument was designed for use on Vicker's Viking Mk. 1B transport but can be adapted for use on other planes.—Aviation Wk, Jan 9, p41

Cuts Machining Time—Nash Motors Div., Nash-Kelvinator Corp., has installed a 17-station, 14-unit transfer machine for machining cylinder heads. Sequence is complex, all valve posts, stem holes, and integral intake and exhaust manifolds included. One machine replaces 15 used previously, cuts machining time from 42.9 to 7.5 man-hr. per 100 heads.—Auto Ind, Jan 1, p52

How to Save Power—Careful study of fluorescent lighting reveals that no savings are made by turning off tubes for less than 1-hr. periods. Tubes deteriorate more rapidly with frequent turn-offs.—Steel, Jan 2, p120

Pays to Improve—Milk cows in one U. S. dairy improvement association last year averaged 8,675 lb. of milk with 350 lb. of butterfat. All cows in U. S. averaged only 5,036 lb. of milk and 201 lb. of butterfat.—Food Ind, Jan, p9

Speeds Wool Grading—Wool fibers can be classified accurately in less than 30 min. with a classification system that eliminates guesswork. Method is based on average fiber weight, fiber-length percentages, and practical fiber count.—Textile World, Jan, p109

Silences Exhaust—Some diesel plants house their mufflers to use jet-action of exhaust to draw air from the building for ventilation. Sometimes, the setup is noisy. Drilling holes through outer shell reduces noise by allowing air to enter and break up pulsations.—Power, Jan, p120

Liquid Switchboard—U. S. Industrial Chemicals resin plant has liquid "switchboard" to which pipes come from various pieces of process equipment. Here flexible metal hoses connect any pairs of pipes to give circuits desired.—Chem Eng, Jan, p109

Foolproof Blasting Hookup—Misfires in tunnel blasting are eliminated by a simple hookup devised by B. Perini & Sons. Closed bus line of 14 bare copper wires in two separate rings are attached to pegs in shallow drill holes. Leg wires of electric caps are hooked to bus in normal way. A 400-v. shooting circuit insures sufficient power. Switch is 1,500 ft. from blast area.—Cons Meth & Equip, Jan, p56

When to Regrind Cutters—One user regrinds carbide cutters when the work becomes hot. Reason—tool life and cutting speed are maximum when chip load is high. When chip load declines, or cutter dulls, heat goes to work rather than chip.—Am Mach, Dec 29, p49

Ships Switch to Stainless—All winch brake and electrical control boxes on Isthmian Lines' ships are being replaced by stainless-steel boxes. Reasons: to eliminate costly replacements and to save time and money when repairs are necessary.—Marine Engrg & Ship Rev, Jan, p94

Heats Melting Pots—French foundry heats cast-iron pots for melting aluminum alloys with beneficial results. High temperature forms oxide scale on pot surface. Time required is 1-3 hr. for plain or low-alloy cast irons.—Foundry, Jan, p116

Gas from Coal—Not Now—Pittsburgh Consolidated Coal Co. is closing its pilot plant for producing synthetic gasoline from coal (See McG-H Digest, Dec '49, p29). Cost of the synthetic fuel was running 40-50% above the cost of gasoline produced from crude. Either the price of coal must drop sharply or the price of gasoline rise before the process can prove commercially successful.—Business Wk, Jan 7, p26

CURBS GUIDE TOURNATRAILERS

To spot Tournatrailers over crusher opening at a Belgian cement plant, R. G. Le Tourneau, Inc. designed these curbs. Danger was that heavily loaded tires of the trailer would drop into the small opening in roadway. Rounded-top curbs guide rig, eliminating danger and assuring accurate spotting over opening.—Cons Meth & Equip, Jan, p45

80-Octane Straightrun Gasoline

Producing 80-octane gasoline on a straightrun basis without reforming units and at the same time conserving acid is notable

HAIFA, ISRAEL, REFINERY of Consolidated Refineries, Ltd., produces 80-octane gasoline on an entirely straightrun basis. This was begun during the war when military equipment in the western desert needed that quality of gasoline.

Distillation equipment consists of two 28,000-bbl. Kellogg units, designed for wax-craking but revamped to form topping units of 8,000-bbl. input. Total crude input is 72,000 bbl., producing gasoline in two streams—"light cut" and "heavy cut."

Refining equipment consists of soda washers, acid treaters, four-stage plumbite treaters, and Badger redistillation units. Originally, the two gasoline streams were combined after soda treatment and then acid treated. An analysis of the acid tars produced showed that the acid treatment led to three main actions:

1. Extraction unchanged of ring-sulphur compounds (thiophanes).
2. Oxidation of mercaptans to disulphides.
3. Extraction of disulphides formed in step 2.

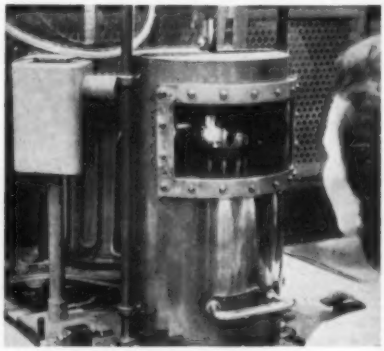
As steps 2 and 3 could be equally well performed in the doctor-treatment and redistillation stages, efficiency of thiophane extraction was of greatest importance. Most of these compounds found in acid tars boiled above 120° C., so the heavy cut was segregated for acid treatment.

This separate treatment increased efficiency of thiophane removal in two ways —first by removing the light cut mercaptans and second by increasing thiophane concentration in oil under treatment. In actual operation, a saving of 60% of sulphuric acid was obtained for the same final gasoline quality.

Byproduct disposal, often difficult and expensive, was a simple matter in this refinery. Spent soda solutions, containing sulphide and hydrosulphide, was sold to a local company manufacturing 60% Na_2S for tanning industries.

Acid tars, containing 50% H_2SO_4 plus varying quantities of sulphonic acids and organic sulphur compounds, were disposed of to another firm for the manufacture of superphosphate fertilizers.

During the war, when aromatic hydrocarbons were scarce, production of xylenes and C_9 hydrocarbons was tried by acid hydrolysis of sulphonic acids in the tars. Difficulty of separation from cyclic sulphur compounds was the main drawback in this process.—Oil & Gas J, Dec 22, p153



CONTROLS R-F. WELDING

Radio-frequency welding of exhaust tubulation assembly in television tubes is controlled by phototube at Radio Corp. of America. Copper tubing is welded in hydrogen atmosphere to nickel-chromium-iron sealing sleeve. Copper melts first. Sudden change in temperature of sleeve at that point permits phototube in housing at left to shut off r-f. generator ½ sec. after copper flows.—Electronics, Jan, p91

Compressed Air Saves Time in Paper-Mill Operations

Man-hours are being saved at the Fernstrom Paper Co. in California by wide use of compressed air throughout the mill. One application is the adaptation of air-actuated hydraulic hoists, such as commonly used in garages, to such jobs as compressing bundles for shipment. The hoist is three times faster than a screw press.

Air lifts have also been installed at presses. Previously the operator had to remove tissues he was joggling as they came off the press when the pile reached a certain height. Now he simply lowers the air-lift table which receives the printed sheets. Saved—time of four men on five presses.

Paper trimmers have similar air lifts at their machines so that work is always at table level. No lifting down from high piles or up from low piles is now necessary.

Rewind shafts are easily handled by air. Fernstrom formerly lifted rolls by crane, causing them to bend and making replacement necessary every few weeks. Now the company has installed an 8-in. air cylinder with two swivel rollers on the end of the piston to push the roll off the rewinder and onto an air-lift table raised to roll level.

Other applications of compressed air include pneumatic load pressure on top rolls, pneumatically controlled instruments, air jets to fold tissue paper, and the usual air-operated tools used so widely in plant maintenance work.—Paper Ind & World, Dec, p1075

Twine from Waste Paper

Waste utilization is getting more attention in all industries. A recent one is making of twine, cordage, and paper bags out of waste paper from paper mills.

Portco Corp., Vancouver, Wash., has developed for its own use an octopus-like machine that spins waste paper into cable-sized cord for use in upholstery. The machine twists rolls of paper twine into one thick strand, called seaming cord.—Chem Eng, Dec, p122-PPI

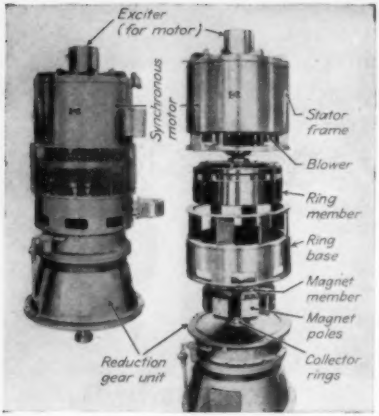
LONGER LEMON LIFE

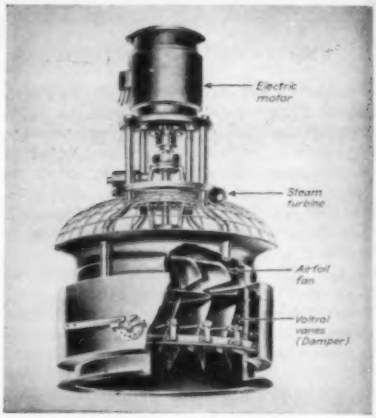
Lemons breathe, inhaling oxygen and exhaling carbon dioxide, and breathing rate determines how long they can be stored. This oxygen analyzer and recorder, built at University of California, determines whether oxygen intake is at best value. Flow meters are attached to jars, each containing 50 lemons, for measuring gas flow.—Electronics,

Borax Reduces Straw Spoilage

Crude borax is the cheapest, most effective straw preserving agent yet to be tested on a commercial scale. That is the substance of a report by the Fibrous Agricultural Residues Committee of the Technical Association of the Pulp and Paper Industry.

Experimental work by eleven paper mills showed that straw treated with borax deteriorated little while untreated straw in uncovered ricks had top layers badly deteriorated. Borax can reduce greatly the 5–15% spoilage loss in ricked straw.—Paper Ind & World, Dec, p1087





UNUSUAL DRIVE ARRANGEMENTS

Synchronous motor, at left, drives a variable-speed pump where high power factor is required. Motor speed is fixed, but pump speed is varied by interconnecting magnetic coupling. At right, an electric motor and steam turbine are tandem-connected to drive an industrial blower. Unit can thus take advantage of steam-turbine efficiency. When steam is not available, motor drive takes over.—Prod Eng, Jan, p102

Curvic Coupling Finds Uses in Various Fields

Developed during the war by Gleason Works, Curvic couplings are finding many applications. Their original purpose was to provide precise connection for built-up airplane engine crankshafts.

Curvic couplings have the same advantages and high precision associated with spiral bevel gears. Essentially they are toothed connection members with teeth spaced circumferentially about the face and extending toward the axis. The teeth have a characteristic curved shape when viewed in a plane perpendicular to the coupling axis.

A recent application has been in lightweight built-up turbine rotors. Curvic couplings both center and drive, so they are ideally suited for such connections.

Another use is in built-up crankshafts for large stationary units. A crankshaft for an 8-cylinder diesel is 12 ft. long and has 32 Curvic couplings joints. Parts are completely interchangeable.

Manufacture and assembly are eased by their use. This has meant applications in machine tools, textile machinery, automotive engines, farm machinery, road-building machinery, and even domestic washing machines.—Mach, Dec 24, p1241

Tests Radiant-Heating Lines

To insure leakproof condition, radiant-heating systems may be checked with General Electric Co.'s electronic leak detector. Freon gas is introduced into the lines. The tip of the detector is then passed along the tubing to detect the escape of any Freon. About 100 joints can be tested in 2 hr.—Elec C&M, Dec, p136

Stainless Clad Annealed Without Bad Scaling

Annealing light-gage stainless clad steel sheets by standard methods employed for solid stainless steel or clad plate produces undesirable scale characteristics and makes pickling difficult.

To avoid these troubles at Alan Wood Steel Co., Surface Combustion Corp. has designed a radiant-tube roller-hearth furnace capable of continuous operation at 2050° F. Carborundum radiant tubes, mounted both above and below the disk-type roller conveyor, are gas fired.

The furnace is divided into three zones. In the first zone, work is heated to annealing temperature. Next is soaking zone, and the third is for partial cooling.

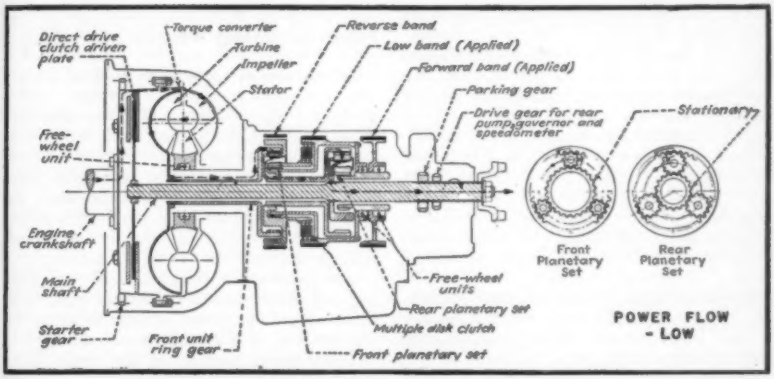
An air-quench unit, following the furnace, also has a roller conveyor. Upper and lower air jets are supplied from a 20,000-cfm. blower.

Furnace temperature in heating and holding zones is 2000–2050° F., which heats work to 1975–1985° F. Discharge temperature from air quench ranges from 550° to 900° F., depending on stock thickness. Heating and soaking take 7–13 min.

Furnace capacity is 5,000 lb. per hr. of No. 12–14 gage stock. Resulting scale is light, permitting pickling time to be cut in half.—Iron Age, Nov 24, p77

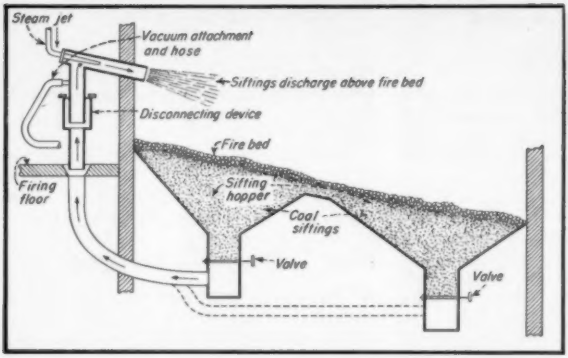
Non-Collapsible Lifeboat

A non-collapsible motor lifeboat has passed successfully U. S. Coast Guard tests. Capsized in heavy seas, the boat was turned completely upside-down. It rolled to an upright position and bailed itself dry through bailing scuppers in a matter of seconds. Boat draws 3½ ft. of water and is 36½ ft. long. Its General Motor diesel engine remained operative. —Marine Engrg & Ship Rev, Jan, p40



STUDEBAKER'S AUTOMATIC TRANSMISSION

New transmission, a joint development of Studebaker and Borg-Warner Corps., consists basically of single-stage torque converter, planetary-gear trains, and hydraulic control system. Hydraulically applied friction bands and clutches determine path of power flow from engine to rear wheels. In low, as shown by broken lines, engine torque is multiplied by action of torque converter and two gear sets. In normal drive, front gear set is inactive. At 18-58 mph., depending on throttle position, direct drive clutch automatically engages. Other features: no-creep device, hydraulic interlocks, and two free-wheel units that act as hill holders.—Prod Eng, Jan, p94



TO SAVE COAL

Steam-jet coal reclaimer has been installed on stoker-fired boilers at an Indianapolis Power & Light Co. plant. It takes siftings from sifting hoppers under stokers and discharges them above the fuel bed. Result—2 tons of coal saved per day and better turbulence in furnace. Disconnecting device at floor level picks up sweepings.—Elec World, Jan 2, p70

British Jet License to Italy Will Aid Aviation Recovery

Agreement has been reached to permit licensed manufacture of British jet-propelled planes and jet engines in Italy. The Italian company is Italiana Commissionaria Materialiale Aeronautico Roma. Contracts have been signed to cover de Havilland's *Vampire* fighter and Goblin turbojet engines.

The licenses are a real boost to recovery of Italy's aviation industry—retarded since the war by political indecision and bad financial situation. Some established firms have closed down. Others have converted to other than aviation manufacture. Those surviving are:

Breda—Flight testing the four-engine, 55–80 passenger BZ.308. Its new design is an 18-passenger BP.471, high-wing monoplane.

Savoria-Marchetti—Producing a four-engine, 30-passenger SM.95. Prototype of an eight-place, low-wing transport has been completed.

Ambrosini—S.7 military trainer is in production. It is a low-wing, two-place tandem plane.

Fiat—A 26-34-passenger transport, the G.212 is in production as is the two-place G.46 trainer.

Macchi—Manufacturing the MB.308 light-plane amphibian capable of 125 mph It is a two-place plane.—Aviation Wk, Dec 19, p31

How to Weld Thermoplastics

Development of successful welding methods for thermoplastics permits inexpensive fabrication of complicated shapes. Most flexible method is the hot gas welding process.

The technique closely resembles gas welding of metals. It utilizes heat to melt a filler rod and the two edges to be joined. The resulting joint is nearly as strong as the parent metal.

Gas pressure required is 5–15 psi. The rate of flow depends on the type and thickness of the plastic. Temperature at the surface of the weld is 375–425° F.

Filler rod is usually of the same composition as the parent metal. Larger-sized rods improve mechanical properties, but should not exceed ¼ in. in dia. It is held at 90° to the work and fed in under slight pressure. For Polythene and Saran, the rod is held at 45°. Welding speed varies from 3 to 10 ipm., depending on the material.—Iron Age, Dec 1, p95

CHEMICAL MOWER

Here is a quick way to keep rights-of-way clear of brush, weeds, or grass. A jeep is equipped with applicator, which can apply separate chemicals or selected mixtures to control all three types of growth or maintain growth sufficient to prevent erosion.—Oil & Gas J, Dec 29, p32

Test Rapid Sand Filters For Cleaning Sewage Effluent

British Water Pollution Research Lab. has completed tests checking the value of rapid sand filters for removal of humus from sewage effluents. Substantial improvement in effluent quality was obtained by mechanical filtration through graded sand, anthracite, or a microstrainer.

Microstrainer can probably be operated at most disposal works by gravity head but certain effluent would have to be pumped to provide head for sand filters. To treat an average dry weather flow of 1 mgd. in rapid sand filters at 100 gal. per sq. ft. would require 425 sq. ft. of beds 2 ft. deep. Additional treatment of effluent in sand or anthracite yields an effluent of higher bacterial quality.—Eng News-Rec, Dec 1, p30

Paper-Thin Ceramic Plates

U. S. National Bureau of Standards has developed a method to make ceramic dielectric plates comparable in thickness to that of paper and mica. The mixture of calcines and bonding agent is pressed under 20,000 psi. in a hardened steel mold and thus converted from powder into a plate. To preserve flatness during firing, the plates 0.003-0.006 in. thick are stacked and weighted with a refractory disk.—Electronics, Jan, p158

Sollac Steel Mills Make France Ruhr's Big Rival

The $133-million steel-construction program in the Lorraine iron basin will make France a stiff competitor of West Germany's Ruhr producers. The plants are to be built in Hazange, Ebange, Seremange, and Metz. They will be operated by Sollac—Societe Lorraine de Leminage Continue—owned by nine French steel producers.

The Sollac project will include:

- An 80-in. continuous hot-strip mill with a maximum annual capacity of 900,000 tons.
- An 84-oven coke plant with an annual capacity of 500,000 tons of steel.
- A 45 x 115-in. blooming mill with an annual capacity of 1-million tons.
- A continuous cold-strip mill.

Sollac is being financed jointly by the French government loans and ECA funds, the latter putting up $50-million.—Business Wk, Jan 14, p104

New Products

High-torque Motor—Tri-Clad high-torque capacitor motor, available in ½-5 hp. for single-phase operation, is offered in two types. Type KCS is for 115/230 v. Type KCR is for 230 v.—**General Electric Co.**—Elec World, Jan 9, p29

Multi-purpose Stand—No. 1-C stand, for mounting of coating and polishing pans, carries pans up to 42 in. in dia., either steam-heated or standard. Stand is easily cleaned.—**F. J. Stokes Machine Co.**—Food Ind, Dec, p113

Cleans Diecastings—Compound of anhydrous alkaline ingredients and surface-active agents is for reverse-current cleaning of zinc-base diecastings before electroplating. Bath temperature is 180-190°.—**Pennsylvania Salt Mfg. Co.**—Foundry, Jan, p202

Trailer-mounted Compressor—Designed to operate small air tools on service jobs, compressor is ideal for utilities and plants. It has semi-pneumatic rubber tires, stabilizer leg, and drawbar.—**Gardner-Denver Co.**—Oil & Gas J, Jan 5, p81

POURS IRON FASTER

Iron foundry increased pouring capacity by 50% and decreased man pouring hours by 50% by switching to fork truck equipped with rotating carriage. Truck operator controls pouring. Ladle has four rectangular steel tubes around base to receive truck forks. Truck and carriage are made by Yale & Towne Mfg. Co.—Steel, Jan 9, p56

Vertical Borer—Largest vertical type jig borer ever built is capable of locating and boring to an accuracy of 0.0001 in. with a work load of 2½ tons. The 15-ton unit has openside construction, a 36x72-in. table, a longitudinal travel of 36 in.—**Pratt & Whitney Div., Niles-Bement-Pond.**—Auto Ind, Jan 1, p54

Dissolves Salt—Sterling Model Lixator produces saturated, crystal clear brine from rock salt. Unit has two nozzles for flushing water and is made of stainless steel.—**International Salt Co.**—Paper Ind & World, Dec, p1130

Shears Billets—Mild-steel billets to 6 in. square and 105,000-psi. steel billets to 4 in. can be cut with accuracy to 0.008 in. Shear is powered with 100-hp. motor, makes 15 strokes per min., and feeds at 140 fpm.—**Bethlehem Steel Co.**—Am Mach, Jan 9, p153

Versatile Woodworking Machine—Radial unit has two circular movements, working at center pivot position above saw table. Different attachments permit over 125 uses.—**Rockwell Mfg. Co.**—Am Builder, Jan, p121

Rubber Boots for Crawler—Crawler equipment can be moved over finished concrete without danger to surface if vulcanized resilient rubber pads are fastened to steel plates. Rubber and steel are joined with a bond strength of 500 psi.—**Metalweld, Inc.**—Cons Meth & Equip, Jan, p109

Proportioning Pump—Variable-stroke chemical proportioning pump has free-floating plunger, operates up to 60 rpm. and 4,000 psi. Stroke is adjustable from 0-2 in.—**Wright Chemical Corp.**—Power, Jan, p138

Speeds Plane Refueling—A new aircraft refueler will deliver gasoline at the rate of 200 gpm. through standard aviation hose. It will defuel plane at 50 gpm. Current equipment refuels at 85-125 gpm. and defuels at 30-40 gpm. Unit is being tested on major U. S. airports.—**Bowser Inc.**—Aviation Wk, Dec 26, p32

PAINT DIRECT TO SPRAY HEAD

Paint is delivered to spray head direct from the original container with this new paint sprayer pump. Unit fits over pail or drum and rolls on casters. It combines supply and agitator. Gray Co., Inc., manufacturer, claims unit will cut labor and materials costs 40%. Unit is available in 5- and 55-gal. sizes.—Factory, Jan, p144

Radiant-tube Furnace—Unit is designed for clean hardening, gas carburizing, and other controlled-atmosphere heat treatments. Work is carried on four trays moved by screws. Radiant-tube heating handles 200 lb. per hr. per sq. ft. area.—**Surface Combustion Corp.**—Steel, Jan 9 p77

Low-cost Panelboard—Designed for group and branch circuit control of industrial and commercial lighting, new NTPR panelboard has six circuits. Plug receptable will accommodate non-tamperable fuses.—**Trumbull Electric Mfg. Co.**—Elec West, Dec, p40

Floating-vane Pump—New Cleco pump features pumping action like that of a square piston traveling in a square cylinder of infinite length. It will handle liquids, gases, or air. Capacities range to 20 gpm.—**Chicago Laboratory & Engrg Co.**—Prod Eng, Jan, p170.

Four-color Bobbin Changer—Automatic bobbin changer for woolen or worsted looms handles four different colors. Upright magazine holds 46 bobbins. Magazine is on driving side above head motion, eliminating danger of oil dropping on bobbins. Electric feeler indicates near-empty shuttles and sets magazine in transferring position.—**Stuer Automatics**—Textile World, Jan, p132

Primary Battery—Cells and batteries of a new 1,000-a.h., non-renewable, add-water battery are assembled at plant and delivered inert and free from deterioration. Cells are made ready merely by adding water.—**Primary Battery Div., Thomas A. Edison, Inc.**—Railway Sig & Comm, Jan, p47

Three-way Switch—Conveyor switch for three-way travel on roller conveyor has series of pivoted straight rollers that can be turned right or left or set straight. Rollers are always in true radial position.—**Standard Conveyor Co.**—Food Ind, Jan, p110

R-f. Hardener—R-f. induction hardening equipment for cylindrical parts has three major parts: automatic loading device, horizontal rotating scanner, r-f. generator. Case depth is controlled by varying feed rates.—**Westinghouse Electric Corp.**—Iron Age, Dec 22, p115

Starts Motors—Manual, autotransformer-type starter for squirrel-cage motors comes in four sizes from 5 hp., 220-440-550 v. to 250 hp., 440-550 v. There are two forms: T with air-break contacts and X with oil-immersed contacts.—**Allen-Bradley Co.**—Elec C&M, Jan, p91

Interchangeable Filters—The R-5000 twin-cartridge respirator protects against seven respiratory hazards. Seven interchangeable filters fit into molded rubber face piece.—**American Optical Co.**—Weld Eng, Jan, p45

Inhibits Rust—Santolene C is a hydrocarbon-soluble, water-insoluble, nonmetallic organic material for use in oil products. Treating cost at 0.002% concentration with displaced fuel credit of 10¢ per gal. is 0.14¢ per 42-gal. barrel.—**Monsanto Chemical Co.**—Oil & Gas J, Jan 5, p81

New Products (Con.)

Rosin Amine Salt—Used successfully by petroleum industry where crude-petroleum extraction depends largely on secondary recovery methods, Rosin Amine D acetate is a surface-active salt in water-soluble form. It controls bacterial action and reduces corrosion.—**Hercules Powder Co.**—Chem Eng, Jan, p161

Vertical Lathe—Automatic production lathe for turning, boring, and facing is designed for negative-rake cutting tools. Cycle timer controls operation. Standard machine has turning slide, facing slide, and tailstock replaceable with boring head. —**Reed-Prentice Corp.**—Am Mach, Dec 29, p121

Nylon Parallel Block, Bearing—Parallel block and clothroll bearing of nylon eliminate danger of oil and rust contaminating cloth. Also, parts are said to last longer, need no lubrication, operate quieter, absorb—not distribute—shock.—**Danielson Mfg. Co.**—Textile World, Jan, p24

Brakes Electric Motor—Disk-type brake stops electric motors quickly and smoothly. Electro-magnet and armature disk produce braking drag when 25-35 watts dc. is applied.—**Warner Electric Brake Mfg. Co.**—Prod Eng, Jan, p158

Plastic Repairs Floors—Plastic-type material patches wood or concrete floors. Within 1 min., patch will support a 50,000-lb. load. No special tools are needed for application.—**Monroe Co.**—Bus Trans, Jan, p134

Standard Boilers—Type C 2-drum-tube boilers have 10,000- to 45,000-lb.-per-hr. steaming capacity. Bent-tube design is compact and symmetrical. Type of firing equipment is optional.—**Springfield Boiler Co.**—Oper Eng, Jan, p72

Traces Isolated Grounds—Location of grounded circuit in ungrounded plant electrical system is speeded by a new detector. Circuits are live and machine can run while check for ground is made. Unit consists of a signal generator and receiver. When point of ground is reached, receiver meter shows a steady reading.—**Excel Electric Service Co.**—Business Wk, Jan 21, p52

STANDARDIZED WORK BENCH

Hunter Spring Co. is using these standardized work benches throughout its plant. Maintenance, except for painting, is eliminated. Plant efficiency has risen 19% since installation. Ends are uniform; tops vary only as to length. Wiring is concealed in channel at back. Job card and envelope holders at back can be replaced by toolmaker's cabinets for assembly jobs. Drawers hold tools.—Factory, Jan, p132

Tests Motor Windings—Testing time is reduced with winding-insulation tester. Any defects in rewound or reconditioned motors are quickly detected by oscilloscope. —**General Electric Co.**—Electronics, Jan, p124

Heats Paint—Circulating paint heater enables paint to be sprayed from original container without use of pressure tank. Paint is heated to 180° F. to obtain better films and use less paint.—**Bede Products, Inc.**—Iron Age, Dec. 29, p88

Fills Drums Automatically—Air-operated system weighs any liquid and fills containers from 1 qt. up in size. All the operator has to do is position drum and press a button. Accuracy is 6 oz. in 52 gal.—**Yale & Towne Mfg. Co.**—Chem Eng, Jan, p138

Detects Plane Smoke—Visual smoke detector for planes, now under test, permits pilot in the cockpit to inspect four compartments in the plant. Light is not emitted through the four ports unless smoke is present to reflect the light. Lights flash on and off to give better warning.—**Walter Kidde & Co.**—Aviation Wk, Jan 23, p44

Types Form Letters—Secretarial time spent typing form letters can be saved by Auto-Typist Model 5060. Hooked up with any standard typewriter, the unit operates from two paper rolls on which form-letter paragraphs are perforated. Paragraphs to be reproduced are selected by push-button. Unit operates pneumatically, typing 150 words per min. Rolls contain 500 lines of typed matter.—**American Automatic Typewriter Co.**—Business Wk, Jan 21, p53

Paves Walk, Curb, Gutter—Self-propelled curb and gutter pavers can be adapted to pave sidewalks as well. Extensions on each side of the engine can be extended to desired width. Screed and trowel are available for various width walks.—**Dotmar Industries**—Eng News-Rec, Jan 19, p120

New Safety Light—New explosion-proof light uses internal air pressure to keep out dangerous vapors instead of a heavy, light-dimming shield. A 200-w. bulb in the new lamp will give equivalent light of a 300-w. bulb in a standard lamp. Lamp is said to have an 85% reflectant coefficient. —**Safe Lighting, Inc.**—Aviation Wk, Jan 2, p29

Cleans Heat Exchangers Automatically—Heat exchangers are cleaned at predetermined intervals by cross baffles in a new cleaning system. Fluid passes through exchanger shell, then across baffles which can be operated manually if desired.—**Davis Engrg. Corp.**—Marine Engrg & Ship Rev, Feb, p104

Collapsible Pallet Box—New collapsible wooden pallet box is designed for either shipment or storage of all types of materials. Side and ends are elm, fastened together with wire. Steel interlocking clamps hold sides to bottom. After being emptied, boxes can be collapsed for storage or shipment.—**G. B. Lewis Co.**—Factory, Jan, p146

Pressure-sensitive Tape—An extra-heavy-duty, pressure-sensitive tape is made of glass fibers with an acetate film back. Filaments are embedded in a resilient rubber adhesive. Stretch is 6% as against 15% for other tapes. It is available in ½-, ¾-, and 1-in. widths in rolls 72 in. wide.—**Minnesota Mining & Mfg. Co.**—Mod Packaging, Jan, p132

LISTEN—NO NOISE

Two-way conversation can be carried on between quiet and noisy locations with Executone's intercommunication aid. Sound-proof booth absorbs high percentage of background shop noises.—Steel, Jan 2, p280

Brake Drum Lathe—Designed for use on drums to a maximum dia. of 24 in. and maximum width of 15 in., a new brake drum lathe can be used for both turning and grinding. Unit permits two turning cuts at once.—**Van Norman Co.**—Fleet Owner, Jan, p75

Wide-range Welder—Generator with range of 40 amp., 20 v. to 250 amp., 40 v. is combined with 31-hp. aircooled engine in Hornet arc welder. Engine has magneto ignition, with impulse starting.—**Air Reduction Sales Corp.**—Steel, Dec 26, p79

Ore Concentrator—Requiring neither centrifugal force nor amalgamation, materials are first screened under water jets and then conveyed to the bowl of a new concentrator. Traveling through a revolving spiral, metals are carried to lowest point in bowl. Number of bowls varies. Machine will handle 10 tons per hr.—**Northwest Machine Works**—Eng & Min J, Jan, p 99

READER SERVICE

As a special service to our subscribers, McGraw-Hill Digest will furnish without any charge additional information about any new product or technical development described. Address your letter to: The Editor, the McGraw-Hill Digest, 330 West 42nd St., New York 18, N. Y., U. S. A. —*THE EDITORS*

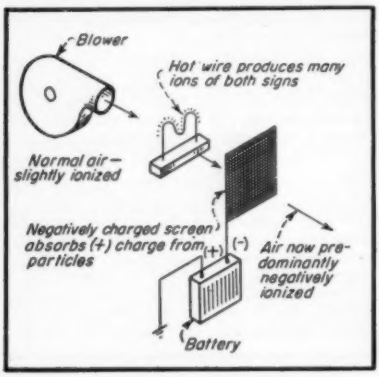
Boom in Porcelain Enamel

Developments in steels and frit processing will broaden application of porcelain enamel. New frits can be applied at temperatures as low as 900° F.

MORE PORCELAIN ENAMEL products will be coming your way. Reason—new developments in steels and frit processing have cut costs, made a better, more widely applicable product.

High manufacturing costs in the past have restricted its use. Steel manufacturers now have steels that do not require extra processing. Frit manufacturers have developed frits that can be applied at lower temperature—well below steel's critical temperature.

Lithium is the chemical permitting low-temperature application of frits to steel. Traditional fluxing materials have been barium, boron, sodium, or potassium. Lithium was too costly until wartime developments cut its cost in half.



NEGATIVE IONS FOR HEALTH

Negatively ionized air is claimed to have therapeutic effect on people suffering from asthma, hay fever, and certain other diseases. Wesix heater, diagrammed above, has negatively charged grid that filters out positive ions. Negative ions pass into room with air stream. Grid charge is low potential from half-wave rectifier.—Elec West, Dec, p70

The lower temperatures will result in lower heating costs. But more important will be the effect—or lack of effect—these lower temperatures will have on steel used. Old enameling temperatures distorted the steel. Frit with lithium can be applied below 1500° F. It can even be applied to the base material at temperatures as low as 900° F.

Ferro Enamel Corp. has developed a low-temperature frit that does not contain lead. It is semi-acid resistant; no ground coat is needed.

Since new frits require more accurate formulation and heat control, Ferro has turned to use of electric frit furnaces. Reduced labor costs will offset the increased cost of electric heat.

Both Armco Steel Corp. and Republic Steel Corp. have announced new steels for porcelain enameling. The Armco steel, a one-coat steel, is about ready for sale. Enameler will apply the nickel flash coating to bond the steel and enamel. Republic's sheet will be supplied with a flash coat so thin it cannot be detected.

These thinner steels and new frits widen the scope of porcelain enamel. Porcelain-enamel houses are now in production. Another building application for porcelain-enamel sheet is in curtain walls, replacing brick and stone. Still another is for interior tiling—about 200-million sq. ft. of baked, painted, and plastic tile are now used annually in the U. S.

The absence of deformation of the steel may make aplication possible in electric transformers. A few have been installed in Cleveland for test.

Space heaters appear to be a big potential user of the product. The enamel has good light-emission properties. It will be possible for refrigerator and home-freezer manufacturers profitably to re-

place baked exteriors with porcelain enamel.

Automobiles too are a potential user. Mufflers and tail pipes of porcelain enamel would last the life of the car. They would have to be redesigned to adapt them to the new material.—Busi-Wk, Jan 7, p42

Mortar, Palletized Blocks Delivered by Fork Truck

Mortar, terra cotta, cinder block, and gypsum block are delivered directly to the scaffold by fork lift trucks on a New York City bus depot construction job. Mortar is delivered in transit-mix trucks to the site; building blocks arrived strapped to pallets, 75 blocks per pallet.

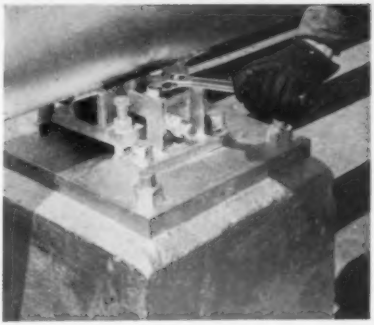
Concrete ramp from street level to second floor makes mechanized materials handling possible.

Banded pallets of blocks are raised to mezzanine by a truck equipped with a special telescoping lift. From mezzanine, standard truck carries pallets to laying up location. Same fork truck, on return trip, carries two mortar boxes holding 10 cu. ft. of mortar.

Mechanized materials handling has freed workmen to tend bricklayers and to move staging.—Cons Meth & Equip, Jan, p66

Low-Carbon Stainless Steels

Carnegie-Illinois Steel Corp. is ready for commercial production of low-carbon (0.03% maximum) stainless steels. Other austenitic stainless steels require addition of columbium or titanium as stabilizers to minimize adverse effects of carbon and thereby make the alloy less susceptible to intergranular corrosion. Refined manufacturing techniques now permit production of 18-8 steels with not more than 0.03% carbon that have corrosion resistance equivalent to that of 18-8 columbium or titanium steels.—Iron Age, Jan 5, p364



ADJUSTABLE PIPE SUPPORT

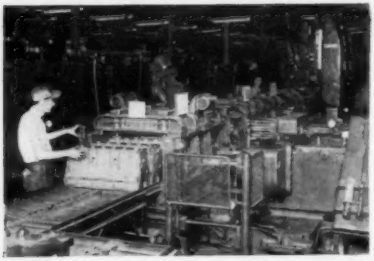
Uneven settlement in foundations can cause severe strains in pipe. Barnsdall Oil Co. uses this adjustable support to avoid such strains on all lines carrying pressures of 300-2,500 psi. Pipe vibration can be dampened by adjusting supports to proper tension. —Oil & Gas J, Dec 29, p78

Unique Distribution System

The underground secondary distribution system of 32-acre Bellewood Park subdivision homes at London, Ontario, Canada, combines unique design with novel construction and new materials. Maintenance and service should be simple and inexpensive.

A low-voltage buried-ring type of distribution in each block serves houses from the rear. Frequent and accessible junctions in the ring make test and sectionalization easy. Ring cables are buried in shallow trenches and covered with concrete guards. Trenches are only 1 ft. wide and 2½ ft. deep.

Other advantages are the use of ground-level kiosks to house transformers; installation of polyvinyl-chloride secondary cable insulation to resist acids, alkalis, and water; and the comparatively reasonable cost of $130 per house—only 25% more than for overhead street-type construction.—Elec World, Dec 17, p 90



TRANSFER MACHINES REDUCE HANDLING

International Harvester Co., in modernizing its plant for production of new Silver Diamond engine, now has 17 transfer-type machines. Result: ordinary handling of crankcase and cylinder-head castings is greatly reduced. Of two Footburt units (left), first drills, chamfers, and taps all holes in both ends of castings. Second machine drills bottom surfaces and two sides. The 70-ft. Ingersoll transfer unit (right) rough-mills top and bottom of crank-case, semi-finishes the top, finishes the bottom and bearing-cap surface, and broaches surface width.—Am Mach, Dec 29, p98

Conveyors for Haulage Have Restrictions, Advantages

Compared with trucks for mine haulage, belt conveyors have definite restrictions, yet have just as definite advantages.

Restrictions:

1. Size of pieces carried should not exceed one-third the width of the belt; one-quarter of the width is best.

2. Belts are not as flexible in application. Points of loading and distribution are not so readily varied.

3. Capital costs are relatively high for small, single operations but drop as job becomes larger, more difficult.

Advantages:

1. Operating costs—including power and maintenance—are probably lower than for any other means of transportation.

2. Operating efficiency is high. Lost time through breakdown is less than for other types of transportation.

3. Efficiency of digging means is high if belt is loaded directly through hopper.

4. Conveyors can handle 30% grades as easily as 10% grades.

The good qualities of trucks and conveyors often can be combined to apply advantages of trucks for gathering from digging units and low haulage cost of the belt conveyor for further movement.—Eng & Min J, Jan, p78

Craze-Proof Plane Window

Six airlines and one transport manufacturer have adapted Sierracin 212 transparent thermoplastic for plane windows. It is a product of Sierra Products Co. The new material weighs less than glass, costs less, and may last the lifetime of the plane. It is more expensive than other plastics. In tests it has been undamaged by standard cleaning compounds.

Initial cost of a *Constellation* installation is about $1,600 for 212 and $2,300 for glass. Per window 212 costs $56; Lucite costs $28. A total of 144 lb. is saved by the 212 installation over glass.

Sierracin 212 can be machined by any method. Its luminous light transmission is 89%; refractive index is 1.55. It resists continuous heat exposure from 210–225° F.—Aviation Wk, Jan 23, p19

New Pack Process Produces Low-Cost Chromium Case

High- and low-carbon steels and cast irons can be made highly wear, heat, and corrosion resistant by an English process called Chromalloying.

The process is similar to pack carburizing. Parts are packed in a box with chromium-rich powder. The box is sealed, then heated in a furnace for 6 hr. Temperatures are 1700-1800° F. for cast iron and 1900-2000° F. for steel.

Chromium penetrates the surface up to 0.005 in. for high-carbon steels and 0.015 in. for low-carbon steels. Surfaces contain as much as 50% chromium with an average of 15% at full case depth.

Chromalloyed articles can withstand atmosphere corrosion and show appreciable resistance to salt water and nitric acid. Heat resistance is excellent up to 1740° F. in highly corrosive atmospheres.

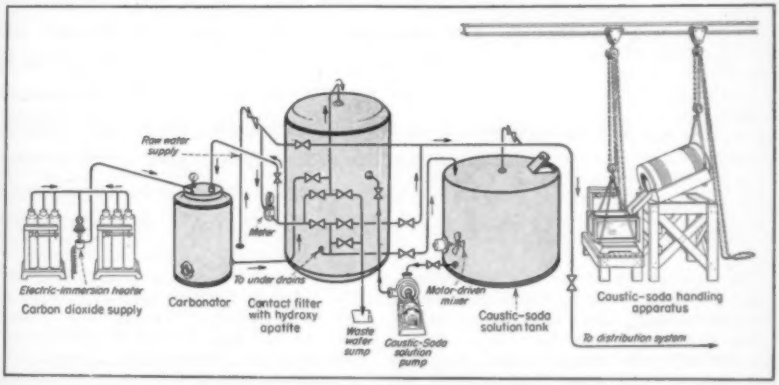
The chromium layer cannot peel off. On low-carbon steel, it is highly ductile, reasonably soft, and readily cold-worked. On cast iron or high-carbon steel, the chromized layer is less ductile, hard, and abrasion-resistant.

Possible uses are many: roller chains, pistons for hydraulic cylinders, aircraft-engine exhaust stacks and manifolds, decorative parts on automobiles and boats, gears, valves, and other similar articles.—Prod Eng, Jan, p146

Antihistaminics Fight Cold

Common colds cost industry more lost days than any other single cause. It is hoped that antihistaminics may reduce this absenteeism. In one series of 572 tests, antihistaminics aborted colds in 90% of the patients when administered in the first hour after symptoms appeared.

Some antihistaminics produce side reactions such as drowsiness. Most antihistaminics are given to adults in a dosage of 50 mg. every 4 hr.—Pharmacy Int'l, Feb, p9



TAKES FLUORIDE OUT OF WELL WATER

Tooth-damaging amounts of fluorides—6.7 ppm. in raw water—are reduced to 1.5 ppm. at Briton, South Dakota. Raw well water is passed through synthetic hydroxy apatite in this closed system. Caustic soda regenerates the absorptive material. Carbonic acid neutralizes residual caustic in the media. —Eng News-Rec, Jan 19, p40

How To Cut Costs

Keep Your Plant Up, Costs Down

. . . Decide what is maintenance and what is not maintenance

. . . Update your organization chart; who is to do each job

. . . Avoid red tape; cut paperwork but get facts

. . . Beat trouble; do not wait for breakdown

. . . Set up equipment records; good systems start with records

. . . Maintain adequate stocks; give quick service

. . . Treat your maintenance like you treat production

. . . Combine best skills, methods, tools, and equipment

"GIVE ME MORE MONEY," says the maintenance man, "and I'll give you better maintenance." But management often does not listen to his plea.

Management—some management, that is—views maintenance as an indirect expense that eats up profits. When operating margins are slim, maintenance budgets are cut. In good times maintenance is still slighted.

Is this wise management? Or might it be better to increase maintenance? The point is that maintenance costs do not mean much by themselves. Plants that do not pay for good maintenance pay for it in other ways. Smart management knows that a well maintained plant is an efficient plant. It knows that money wisely spent on maintenance is recovered in savings.

Good maintenance combines the skills of men, the services of tools, and the

proper use of materials to do the cheapest possible job. This requires good organization, sane paperwork, and efficient methods. There is no "best" way to good maintenance. Each plant has its own problems. Each plant will have different answers. But basic principles apply to all. Here are a few.

. . . Decide what is maintenance and what is not maintenance

Good plant maintenance is more than upkeep. Maintenance plays a vital part in planning and establishing manufacturing facilities and equipment.

There is no standard formula for maintenance functions. But it is a mistake for management not to define the functions of maintenance within the plant. Otherwise, misunderstandings arise. Work is duplicated between maintenance and production personnel.

Definition of maintenance responsibilities is the first step in controlling maintenance costs. Two-way analysis will help fix responsibility.

First, list all structures, equipment, and services. Begin with general headings. Under each heading, list all the physical components. Second, list what the maintenance department must do to maintain the items listed. Production equipment may, for instance, need inspection, cleaning, adjustment, lubrication, overhaul, repair, improvement, relocation, or dismantling.

The list will be long. But it tells management what the nature and complexities of maintenance are within the plant. It will tell you what is and what is not maintenance.

. . . Update your organization chart; who is to do each job

Good organization of a maintenance section requires more than an organizational chart. But the chart helps. It defines authority and responsibility. It helps to get the right people in the right jobs to perform the necessary work the cheapest way.

Here is a line on the successful maintenance organization of today:

- Maintenance head reports to top management. His title may be that of plant engineer. The department should have equal standing in the plant with production.
- Staff specialists are proving valuable to the chief of maintenance. They may advise on mechanical, building, electrical, and special process problems. Plants that cannot afford full-time specialists find outside consultants helpful.
- Trend is to specialization in maintenance crafts, necessary in complex industries.
- A competant staff of clerks to handle routine work orders, dispatching, cost records, equipment records, and executive reports.
- More and better maintenance stock rooms are being organized. Aim: to cut inventory loss and make maintenance more efficient.
- Training of both supervisory and rank-and-file maintenance personnel.

An organizational chart on the office wall is an aid to good maintenance. It shows craftsmen their responsibilities. It carries each job to completion, showing each man just what he is to do.

A combination of plant-wide and zoned maintenance may be best suited to your plant. Both plans have good features. Centralized maintenance in large plants may require too much travel time to and from the job. Some people believe high efficiency is attained by having specialists right on the job to maintain equipment. But this may overstaff certain areas in production. A merger of the two plans may be the best answer.

The number of men in your maintenance section depends on your plant. Many formulae have been derived to determine the number needed. But do not use a set formula as a conclusive guide without checking its application.

Wage incentives are as applicable to the maintenance worker as they are to

the production worker. He reacts to them just as well. The "jobbing" characteristics of maintenance work make application of incentives more difficult. Whatever the incentive plan used, if it cuts maintenance costs by increasing worker's wages, it is most certainly worth looking into.

Multi-shift production demands parallel maintenance shifts. Despite extra-shift pay bonuses, it may pay to move maintenance from the first to a later shift. Janitoring can be done with fewer men on the later shifts. Some maintenance jobs require that the machine be idle during maintenance.

. . . Avoid red tape; cut paperwork but get facts

Efficient low-cost maintenance is impossible without some paperwork. Costly maintenance cannot be spotted without records. Most plants do not have to be told the benefits of maintenance paperwork but many of them do not get all they could out of it.

Good maintenance paperwork has three functions: (1) work authorization, (2) work control, and (3) work measurement. Cost leaks can occur in all three.

Work Authorization—Once authorized it is too late to question why maintenance work was done.

Periodic service jobs, such as cleaning, lubrication, and preventive maintenance, once started usually go on unquestioned. Review, though, is warranted. Periodic checking of repair work, alterations, and new construction is insufficient. Each order must be followed.

The "no order, no work" rule must be applied sensibly. Emergency work must be handled without an order.

Before an order is signed, ask the following questions: Why is the job necessary? How much will the job cost? Will the job pay?

Work Control—Work control involves work planning, scheduling, followup, and work approval. Work planning determines the nature of each job, how it is done, and what materials are needed. It gets the best job done at the least cost.

Work scheduling decides when jobs are to be done. Mistakes in scheduling cost money in extra machine downtime and waste time of the repair man. Scheduling methods will vary from company to company. Follow-up makes sure jobs are done as scheduled. Periodic progress reports to top management are a good idea to keep it fully informed on what is going on. Work approval closes maintenance job.

Work Measurement—Maintenance can not measure maintenance results strictly by unit costs. The only valid measurement of good maintenance is that which keep the production department in top condition. Summary reports of work progress and costs will be of value to the maintenance chief when work norm has been determined. They uncover excessive costs caused by inefficient administration or work methods.

. . . Beat trouble; do not wait for a breakdown

Breakdowns mean that the plant needs preventive maintenance. Cost of a preventive maintenance program is not hard to justify. List total costs—repair labor materials, overtime and extra charges, operator idle time, spoilage, and rework. Then estimate what the costs of preventing the breakdown would have been.

Intangibles of less downtime are important. Do not overlook increased output, better quality control, and lower plant depreciation assets. Remember that today it costs twice as much to replace a rundown plant or machine as it did 10 years ago.

Remember too, preventive maintenance will not overcome poor machine operation.

Include in your preventive maintenance program only those items on which preventive maintenance will pay or make work safer. If funds are limited, at least set up a program to cover critical equipment. Make sure important items are

not missed and left out of the program.

Check lists should be provided to guide inspectors and servicemen on complex equipment. Frequency of inspections should be checked to determine whether maintenance is enough or too much. Combine the inspections with maintenance work-order system so that all repairs get prompt attention and follow-up.

. . . Set up equipment records; good systems start with records

Value of records to low-cost maintenance of equipment cannot be underestimated. They are the basis for every preventive maintenance program. They provide a basic record for identifying all plant assets by an inventory number. They make good plant-location record for movable units. They supply detailed engineering specifications of each machine or structure. And they record original-purchase data, installation costs, and the nature and cost of upkeep.

From a cost-cutting standpoint, there is no better way of determining the value and performance of a machine than by periodically reviewing its maintenance record. If repair costs are excessive, replacement may be warranted. When time comes to purchase new equipment, the records will give valuable information as to which machine to buy.

. . . Maintain adequate stocks; give quick service

The maintenance section's stockroom is the key to an efficient section. Three points are of major importance:

- Adequate stocks make it unnecessary to substitute parts and materials. They minimize delays and downtime.
- Careful records reduce inventory, cut waste and misuse, enable you to find cost figures.
- Quick service minimizes non-productive time of specialists.

A centrally located stockroom is the most efficient. It is ideal if all materials could be brought to the craftsman. It is inefficient for craftsmen to handle materials. Inventories must be watched. Standardization of machines helps on inventory.

One company revised its parts quota by analyzing the repair parts needed by each new machine as it arrived, and stocked the part immediately. It clears shelves of parts when a machine is retired.

. . . Treat your maintenance like you treat production

If you want good maintenance, you must give it the same quality tools and plant facilities that you give production. Equipment that cuts costs for production —materials-handling equipment, machine tools, hand tools, and instruments—will also cut costs for the maintenance section. They must be provided.

. . . . Combine the best skills, methods, tools, and equipment

To save money on maintenance you must restudy your program at regular intervals. Include all phases—electrical, mechanical, care of structures, services, lubrication, housekeeping.

Be sure you use worker's know-how to best advantage. The men doing the job often have good ideas as to how job might be done better—and cheaper. Make sure all maintenance men have adequate instruction. Work simplification studies will cut costs. Improved methods, new tools, different materials—all should be studied.

Mechanization, as in production, will reduce cost. Management has been slow to apply mechanization to maintenance.

Your maintenance cost-reduction program hinges on two points:

1. Top management must be convinced of the value of keeping the plant and equipment in top operating condition at the lowest possible cost. It must tell the engineer what his responsibilities are.

2. The engineer must employ the personnel, tools, and methods that will best fulfill his jobs.—Factory, Jan, p56

CLARK CAN CUT *Your* Handling Costs, *Too!*

Industry and commerce throughout the world have found that CLARK'S Modern Materials Handling Methods and Machines cut operating costs to an amazing degree. What Clark is doing day in and day out for others, it will do for you. Your CLARK Distributor—there's one near you—will be pleased to discuss your operations. And there'll be no obligation on your part when you CONSULT CLARK.

CHARMILLE WORKS, GENEVA, SWITZERLAND

Clark fork-lift trucks make heavy handling astonishingly safe, simple and economical. They lift, transport, load and unload materials of all kinds and sorts, and in so doing make more jobs—better jobs—for labor.

Clark fork-lift trucks handle cumbersome items as easily and as swiftly as they handle neatly-palletized unit loads. In speeding essential operations, reducing accident and damage losses, making all cubic space available for storage, they *guarantee* substantial savings.

CLARK EQUIPMENT COMPANY • EXPORT DIVISION

BATTLE CREEK 73, MICHIGAN, U.S.A.

Other Plants—Buchanan—Jackson—Berrien Springs, Mich. Distributors in Principal Cities Throughout the World

New Profits
IN FOREIGN TRADE

For You... AND FOR FOREIGN TRADERS EVERYWHERE

No matter what you handle, the Port of Seattle Foreign Trade Zone can add speed, convenience and new profits to your import-export operations.

Your goods enter the Zone without payment of duty, can be stored for indefinite periods of time, may be cleaned, marked, labeled, re-packaged or otherwise manipulated . . . all while in the Zone.

You pay duty only on goods as removed for U. S. distribution. No duty whatsoever on re-exports.

Our great new $11 million Seattle-Tacoma International Airport will speed the movement of your high-value goods. You quickly meet demands of domestic or foreign markets.

Take advantage of Port of Seattle's time-and-money-saving Great Circle Routes to Hawaii and the Far East. We will be happy to give you specific information on how the Zone can make your business bigger and more profitable.

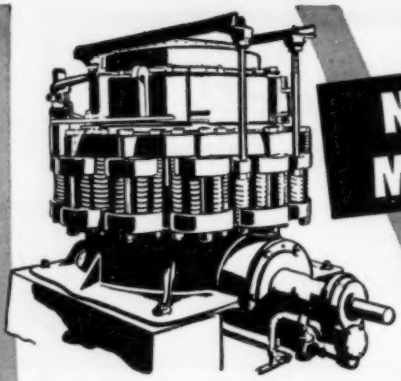
The Expanding
PORT OF SEATTLE

COMMISSION
J. A. Earley, *President*
E. H. Savage, *Vice-President*
RADM. Gordon Rowe, *Secretary*
Col. W. D. Lamport, *General Manager*

WRITE TODAY FOR FREE INFORMATION

Port of Seattle, Dept. 111, Box 1878,
Seattle 11, State of Wash., U. S. A.
Gentlemen: Please send me a free copy of your pamphlet titled "New Profits in Foreign Trade".

Name .....
Business .....
Address .....
City ..... *Country* .....

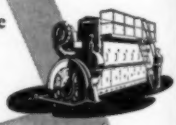


NORDBERG MACHINERY

for Processing Ores and Industrial Minerals

WHETHER you are opening a new deposit, expanding present operations or replacing old equipment, the complete line of Nordberg processing equipment will meet your machinery requirements

In operations involving fine crushing, Symons Cone Crushers have proved to be without equal for big production at low crushing cost. Symons Cones are available in Standard, Short Head and Intermediate types, in a wide range of sizes to suit your requirements.



NORDBERG MFG. CO.

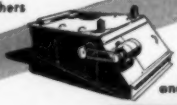
MILWAUKEE, WISCONSIN, U. S. A.

CABLE ADDRESS: *NORDBERG*

Primary and Secondary Crushers

Diesel Engines Gasoline Marine Engines

Processing Machinery For Ores and Industrial Minerals



Screens and Grizzlies

LONDON
Brook House, Park Lane

JOHANNESBURG
P. O. Box 4139

MEXICO, D.F.

NORDBERG

Production Ideas

from Manufacturers' Catalogs

3-1 Magnet Wire—Electric Auto-Lite Co. 88p. Covers the many types of magnet wire manufactured with most complete detail on specifications and use. Engineering tables included are of wide general service.

3-2 Materials Handling—Yale & Towne Mfg. Co. 48p. Catalog P602-10-47-50 illustrates complete line, including hoists, all kinds of industrial trucks, tractors, trailers, and dial scales.

3-3 Machine-tool Equipment—Van Norman Co. 94p. Series of folders describe the line of milling machines of all types, including Nos. 2, 3, 6, 12, 16, 22, 26, 36. Folder A 148 illustrates attachments, cutters, arbors, and accessories.

3-4 Pumps for Industry—Warren Steam Pump Co. 96p. Complete pump-line folder covers the many types made by Warren. They include reciprocating, centrifugal, and Compacunit pumps for variety of uses.

3-5 Large D-c. Motors—Allis-Chalmers Mfg. Co. 40p. Catalog 05B6002A illustrates construction and use of d-c. motors and their control for heavy-duty drives.

3-6 Office-equipment Folder — Burroughs Adding Machine Co. 30p. Five bulletins describe receipting and validating machine, adding machines, calculator, descriptive-bookkeeping and other bookkeeping machines.

3-7 Textile Machinery—H & B American Machine Co. 40p. Nine folders give wide coverage of textile machinery. They include open-room machinery, picker, drawing frame, slubber, spinning frame, twisters, rubber covering machine, roving tester.

3-8 Molding Plastics—Hydraulic Press Mfg. Co. 16p. "Profits from Plastics" is an illustrated story on how the right press reduces costs. Shows sample jobs.

3-9 Controls Time Cycle—Taylor Instrument Cos. 16p. Bulletin 98154 on Flex-O-Timer cycle controllers emphasizes automatic control of processes.

3-10 Process Heating—Black, Sivalls & Bryson, Inc. 34p. Catalog 54 illustrates in color the construction of volume, firebox, and fluid jacket unit heaters and use in treating systems.

3-11 Modern Plastics—Bakelite Corp. 24p. Bulletin J-485-6-49 is a simplified guide to Bakelite and Vinylite—characteristics, uses, and fabrication.

3-12 Slits Coils, Sheets—Yoder Co. 75p. "Slitting Lines" covers design and operation of slitters, including time study and cycle analyses, plus specifications and other data on uncoilers, slitters, recoilers, coil cars, and scrap choppers.

3-13 Bottling Equipment—Crown Cork & Seal Co. 64p. Three bulletins 1M-47-9, M-121-10M-49.5, and M-116-13.5M-49.7 give the sparkle and progress of beverage bottling—suggested layouts and the equipment features of modern bottling practice.

3-14 Belt Drives—American Pulley Co. 88p. "American Drives" covers the construction, selection, and installation of belt drives applied to many industries.

3-15 Industrial Chemicals—Harshaw Chemical Co. 24p. Covers, besides facts on company, the line of industrial chemicals offered in export.

3-16 Wiring Devices—Arrow-Hart & Hegeman Electric Co. 136p. Catalog Y describes the entire line of wiring devices and enclosed switches. Hundreds of items are pictured.

3-17 For Fast Earthmoving—Schield Bantam Co. 22p. Catalog 748 presents line of earthmoving equipment, including power shovel, trench hoe, dragline and clamshell. Crane and piledriver also described.

3-18 Stem and Plate Casters—Bassick Co. 44p. Catalog No. 2X describes and illustrates casters and accessories for wood and metal furniture, hospital equipment, appliances, and miscellaneous products.

3-19 Foreign Trade Zone—Port of Seattle Commission. 28 and 8p. Two booklets, "Port of Seattle" and "New Profits to Foreign Traders", tell the story of an expanding port and trade zone, and how and why it pays foreign traders to use it.

3-20 Sewage Treatment — Builders-Providence, Inc. 20p. Bulletin 287B discusses the measurement, control, and chemical treatment of sewage and sludge and the equipment needed for the job.

3-21 Phenolic Plastics — B. F. Goodrich Chemical Co. 28p. Bulletin H-4 covers all

Production Ideas (Cont.)

phases of Hycar-Phenolic blends—properties, uses, data tables.

3-22 Lubrication — Tide Water Associated Oil Co. 20p. "Lubricania" is a cleverly illustrated story of the why and how of lubrication.

3-23 Efficient Filters — % Proportioneers, Inc. % 20p. Bulletin 1800 covers Pur-O-Cel diatomaceous-earth filters for water purification plants, cutting oils, varnishes, milk, beer, wine. Auxiliary equipment is described.

3-24 Fork Trucks, Handbook — Towmotor Corp. 16 and 28p. Folder gives specifications on lift truck and tractor line. "Operators Guide" is a valuable handbook of ideas.

3-25 Serve Offices—Underwood Corp. 20p. Series of bulletins describe adding machines, adding and figuring machine, composite accounts payable machine, typewriters, and fanfold writing machine.

3-26 To Control Vibration—Felters Co. 16p. Covers Uniscorb, a felt-like material that simplifies machine anchoring and controls vibration and noise.

3-27 Power Generation—De Laval Steam Turbine Co. 24p. Bulletin 1181A describes steam turbines, gearing, pumps, blowers, compressors. Well illustrated.

3-28 Silicate of Soda—Diamond Alkali Co. 20p. Pocket-sized booklet covers liquid silicates, concrete silicate, and others useful in industrial processes.

3-29 High-vacuum Pumps—Kinney Mfg. Co. 24p. Bulletin V45 gives complete details on uses, advantages, operation, selection of various types of high-vacuum pumps.

3-30 Condensate Control — Cochrane Corp. 24p. Catalog 3250 discusses condensate drainage control and fuel savings possible with steam processing equipment.

3-31 Cylindrical Grinders—Landis Tool Co. 24p. Catalog I-49 gives complete description specifications, and setups of 12-in. universal cylindrical grinder.

3-32 Plastics Molding Presses — Baldwin Locomotive Works. 20p. Bulletin No. 251 covers hydraulic molding presses for compression and plunger molding of plastics, also steam platen and die-hobbing presses.

3-33 Improved Plasticizers—Rohm & Haas Co. 17p. Bulletin MR-4-46 is a technical discussion on six types of plasticizers for use with polyvinyl chloride and copolymers.

3-34 Transmission Belting—U. S. Rubber Co. 28p. Bulletin M-9922 gives engineering and installation data on flat transmission belting—what to use and how to use it.

3-35 Soil Dewatering — Moretrench Corp. 64p. "Wellpoint System" describes and illustrates means of dewatering, stabilizing, and preventing mass movement of wet soil during excavation.

3-36 Rubber and Plastics Mills — Farrel-Birmingham Co. 40p. Catalog 173 discusses in detail rubber and plastics mills, refiners, washers, crackers, calenders.

3-37 Kelloggram—M. W. Kellogg Co. 20p. Issue No. 1 of 1950 series tells of the complete modernization of an oil refinery and what resulted.

3-38 Anti-corrosion Piping—Taylor Forge & Pipe Works. 32p. Bulletin 485 gives specifications on pipe and fittings and data on corrosion resistance.

COPIES of these manufacturers' catalogs will be sent free to subscribers. Fill in squares with catalog numbers desired and mail to the Editor, McGraw-Hill Digest, 330 W. 42nd St., New York 18, N. Y., U. S. A.

☐ ☐ ☐ ☐ ☐
☐ ☐ ☐ ☐ ☐
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Not good after June 1, 1950. (This coupon MUST be completely filled in. Please TYPE or PRINT.)

Name .....

Title .....

Company .....

Address .....

.....

"You'll save time and money the Printing Calculator way"

There's no place for waste in business figure work, and with the new Remington Rand Printing Calculator you eliminate re-runs for accuracy and manual copying from hard-to-read dials. Extra motions are gone because every problem is automatically calculated—every factor, and every answer is automatically printed on the tape.

The Printing Calculator automatically divides, multiplies, adds, subtracts and prints problem and answer. You have a money-saving calculator that prints *plus* a completely electrified adding machine—two machines for your one modest investment.

See how you can save through greater figure efficiency . . . send the coupon below to Remington Rand Inc., 315 Fourth Ave., New York 10, N. Y.

Copyright 1950 by Remington Rand Inc.

Remington Rand

Please send free of charge further information on how to save the Printing Calculator way.

NAME.....

FIRM.....

ADDRESS.....

CITY..... COUNTRY.....

C-16

5 Timely McGRAW-HILL BOOKS

VACUUM EQUIPMENT AND TECHNIQUES

Edited by A. GUTHRIE and R. K. WAKERLING, Radiation Laboratory, Department of Physics, University of California. *National Nuclear Energy Series.* Manhattan Project Technical Section (Div. I—Vol. 1). 264 pages, $2.50

This volume, concerned with the development and study of high vacuum equipment made by the personnel of the University of California Radiation Laboratory, is a compilation of observations made in the course of developing high vacuum equipment for use in electromagnetic separation plants. The routine production of high vacuum in large systems on a scale never previously undertaken was required in the operation of the electromagnetic separation process, and as a consequence, the problems involved were of a magnitude which made it necessary to do a considerable amount of pioneering work on both equipment and testing. One topic of particular interest is the use of the vacuum analyzer and helium leak detector which were developed for use in the project and proved to be very sensitive instruments. Throughout the volume liberal reference has been made to the available published literature.

ELECTRONICS IN ENGINEERING

By W. RYLAND HILL, Associate Professor of Electrical Engineering, Department of Electrical Engineering, University of Washington. *McGraw-Hill Electrical and Electronic Engineering Series.* 274 pages, $3.50

This text is designed for senior and graduate students in engineering and allied sciences who find the need for an understanding of electronics and its applications to measurement and control in their respective fields. The treatment is sufficiently analytical to interest such students, yet contains enough practical applications to illustrate the uses of electronics in the various engineering fields. The book provides material for a one-quarter or one-semester course covering vacuum and gas-filled tubes, rectification, amplification, feedback, the cathode-ray oscilloscope, and simple control and instrumentation techniques. Wherever possible there is presented a complete graphical picture with coordinated circuit diagrams and wave forms. The material is divided into many short chapters to facilitate selection and to fit the needs of any specific class.

AUDIT WORKING PAPERS

By MAURICE E. PELOUBET, C.P.A.; Partner, Pogson, Peloubet and Company; Member, American Institute of Accountants. *McGraw-Hill Accounting Series.* 508 pages, $8.50

A guide that may be followed with confidence on all auditing assignments, this volume gives a detailed, illustrative set of audit working papers prepared as they would be under normal working conditions for a manufacturing corporation in the $10,000,000 class organized as a holding-operating company with several subsidiaries. The working papers are devised to provide basic information for preparing comprehensive reports to management, stockholders, the Security and Exchange Commission, and other regulatory and governmental bodies, as well as for preparing federal and state income tax returns. Examples of such reports are given. In addition, the book shows applications of the method of preparing working papers to the accounts of a service corporation, a trading partnership, and an estate.

ELECTRICAL ESTIMATING

By RAY ASHLEY, Research Engineer, Electrical Contractors' Assn., Chicago; Member, Chicago Electrical Estimators' Assn.; Electrical Engineering and Estimating Consultant. 312 pages, $6.50

In this manual is given all the information necessary to estimate the cost of any electrical construction job quickly and accurately. Practical methods, tips, and guides and scores of sample estimates of actual construction costs provide the best in professional electrical estimating practice. This book covers everything from the selection and training of electrical estimators and the proper use of estimating tools, to the cost of preliminary estimates and the preparation of final bid sheets. Also covered are the design and use of estimating forms, the importance of weights and dimensions, and estimating work of other trades.

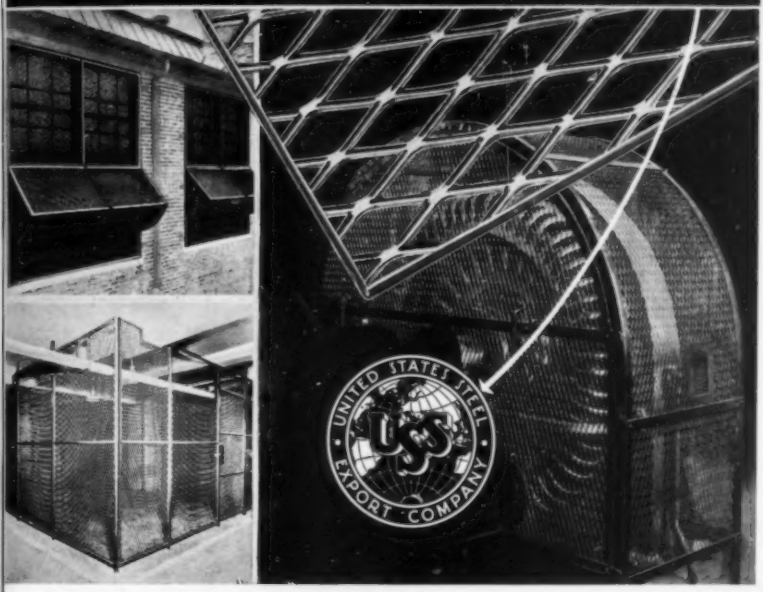
COMMUNICATION CIRCUIT FUNDAMENTALS For Radio and Communication Engineers

By CARL E. SMITH, Vice-president in Charge of Engineering, United Broadcasting Company, and President, Cleveland Institute for Radio Electronics. 401 pages. $5.00

Here is an important new text in circuit fundamentals for students, operators, technicians, and engineers. It covers the physics of circuit elements, including vacuum tubes, and presents the fundamentals of alternating- and direct-current circuits. The general plan of presentation is first to discuss circuit constants and then use them in a treatment of direct-current circuits. After a study of magnetism, inductance, and capacitance, the principles of alternating-current circuits are treated. Some of the more important network theorems are covered along with examples of their use in order to simplify otherwise very difficult problems.

McGRAW-HILL BOOK CO. 330 West 42nd Street, New York 18, N. Y., U.S.A.

STEEL FOR THE WORLD OF TOMORROW



EMECO EXPANDED METAL...

* protects factory workers from machinery
* guards buildings and storage areas from theft

Emeco Expanded Metal is designed specifically to help eliminate needless losses due to theft in buildings and storage areas —or personal injury to machine operators. Strong, durable sheets of this diamond-shaped steel mesh make easily fabricated point-of-operation machine guards . . . attractive door and window guards . . . neat, economical storage partitions.

Emeco Expanded Metal can be formed to any desired angle, or cut in any direction, *without the strands unraveling.* Because of its open mesh construction, it provides maximum protection while assuring adequate ventilation and light. Available in ½", 1", and 1½" meshes, regular or flattened, Emeco helps keep your plant operating smoothly.

UNITED STATES STEEL EXPORT COMPANY

30 CHURCH STREET, NEW YORK 8, U. S. A.

WE SERVE THE WORLD with superior steels from the world's largest steelmaker

ADVERTISERS IN THIS ISSUE

ALLIS-CHALMERS MANUFACTURING CO.... 16
Compton Advertising, Inc.

AMERICAN CYANAMID CO.....3rd Cover
Hazard Advertising Co.

CHRYSLER EXPORT CORPORATION..4th Cover
Ross Roy, Inc.

CLARK EQUIPMENT CO. 58
Gebhardt & Brockson, Inc.

COLORADO FUEL & IRON CORP..... 67
Fuller & Smith & Ross, Inc.

DOW CHEMICAL OF CANADA, LIMITED
Harold F. Stanfield Limited 2nd Cover

du PONT de NEMOURS & CO. (INC.), E. I... 6
Robert Otto & Company, Inc.

H & B AMERICAN MACHINE CO..... 68
George T. Metcalf Company

HYDRAULIC PRESS MFG. CO..... 7
The Jay H. Maish Company

HYSTER COMPANY 15
Simon & Smith Advertising

INTERNATIONAL GENERAL ELECTRIC CO.. 8
Grant Advertising, Inc.

INTERNATIONAL HARVESTER EXPORT CO. 12
McCann-Erickson Corp.

McGRAW-HILL BOOK CO..... 64

MONSANTO CHEMICAL CO..... 11
Gardner-Advertising Co.

NORDBERG MANUFACTURING CO..... 60
Russell T. Gray, Inc.

PORT OF SEATTLE..... 59

REMINGTON RAND, INC..... 63
Leeford Advertising Agency, Inc.

STANDARD OIL COMPANY (NEW JERSEY).. 2
Foreign Advertising & Service Bureaus, Inc.

UNDERWOOD CORPORATION 1
Irwin Vladimir & Co., Inc.

UNITED STATES STEEL EXPORT CO..... 65
Batten, Barton, Durstine & Osborn, Inc.

WESTINGHOUSE ELECTRIC INT'L CO.....4, 5
Fuller & Smith & Ross, Inc.

Publications Digested:

McGraw-Hill Publishing Co., 330 W. 42nd St., New York 18, N. Y.

American Machinist • Aviation Week • Bus Transportation • Business Week • Chemical Engineering • Coal Age • Construction Methods • Electrical Construction & Maintenance • Electrical Merchandising • Electrical West • Electrical Wholesaling • Electrical World • Electronics • Engineering & Mining Journal • Engineering News-Record • Factory Management and Maintenance • Food Industries • Industrial Distribution • Machinist (London Office) • Nucleonics • Operating Engineer • Pharmacy International • Power • Product Engineering • Science Illustrated • Textile World • The American Automobile (Overseas Edition) • Welding Engineer

Chilton Company, Chestnut and 56th St., Philadelphia 39, Pa.

Automotive Industries • Boot & Shoe Recorder • Commercial Car Journal • Department Store Economist • Distribution Age • Hardware Age • Hardware World • Motor Age • The Iron Age • The Jewelers' Circular-Keystone • The Optical Journal & Review of Optometry • The Spectator

Fritz Publications, Inc., 59 East Van Buren St., Chicago 5, Ill.

The Paper Industry and Paper World

Industrial Publications, Inc., 5 South Wabash Ave., Chicago 3, Ill.

Ceramic Industry

Modern Packaging Corp., 122 E. 42nd St., New York 17, N. Y.

Modern Packaging

Modern Plastics, Inc., 122 E. 42nd St., New York 17, New York

Modern Plastics

Petroleum Publishing Co., 211 S. Cheyenne Ave., Tulsa 1, Okla.

The Oil and Gas Journal

Simmons-Boardman Publishing Corp., 30 Church St., New York 7, N. Y.

American Builder • Marine Engineering & Shipping Review • Railway Age • Railway Engineering & Maintenance • Railway Mechanical Engineer • Railway Signaling

The Penton Publishing Co., Penton Building, Cleveland 13, Ohio

Steel • The Foundry

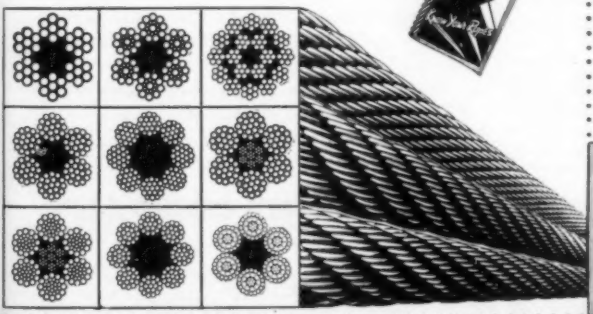
McGraw-Hill World News Bureaus: London, Paris, Frankfurt, Tokyo, Bombay, Melbourne, Buenos Aires, Rio de Janeiro, Stockholm, and 60 other industrial cities.

These facts will help you get longer life from WICKWIRE ROPE

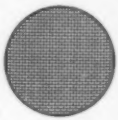
Wire rope performance depends upon rope quality, upon proper maintenance, and upon careful selection to meet particular conditions of abrasion and bending anticipated in service.

No finer quality wire rope can be purchased than Wickwire WISSCOLAY *Pre*-formed, therefore, it will outlast and outperform ordinary wire rope whenever it has been properly selected and maintained.

Let us send you a free copy of our 82-page book "Know Your Ropes." It is profusely illustrated and full of suggestions on proper selection, application and usage of wire rope. For your copy, write the General Export Office, The Colorado Fuel & Iron Corporation, 500 Fifth Avenue, New York 18, U. S. A. Cable: "Wickspen."



tough-tempered **COLORADO Forged Steel GRINDING BALLS**



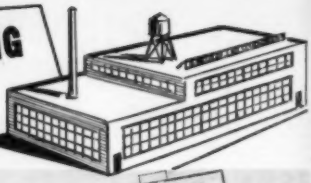
precision-fabricated **WISSCO & CALWICO WIRE CLOTH**

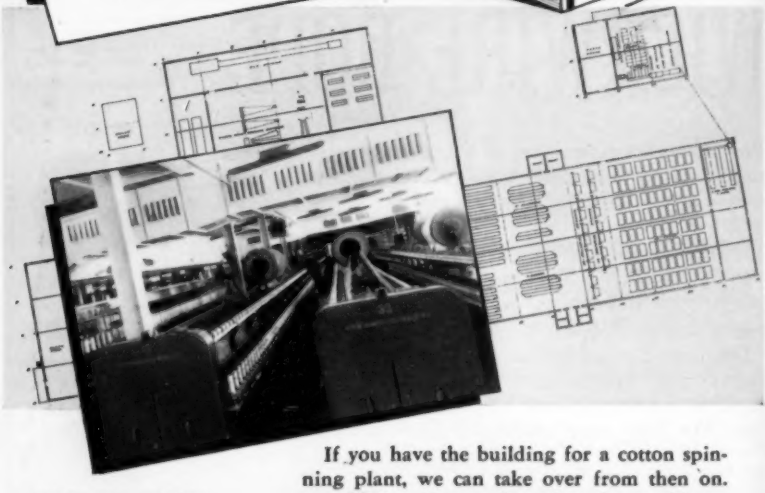
custom-engineered **WISSCO** Woven Wire **CONVEYOR BELTS**

CF&I EXPORT

FOR A BETTER BUY ... CFI

YOU SUPPLY THE BUILDING WE DO THE REST





INSTALLATION— H & B BEAM TWISTERS

Forty in all, 5½" gauge, 4" dia. rings, 8" traverse, 160 spindles per frame. Case hardened double line bottom rolls; single line top rolls. Ball bearing beam stand, with brake assembly, assures uniform and even tension. Superstructure accommodates one or more beams as required.

If you have the building for a cotton spinning plant, we can take over from then on. In addition to manufacturing the machinery you need, we can figure what machines and how many you require for a given yarn organization, and lay out a floor plan which will assure efficient straight-line production.

If you need only one machine, your order will receive equally careful attention.

Tell us your problem in detail and let us make recommendations.

H & B AMERICAN MACHINE COMPANY

Builders of Modern Textile Machinery

FACTORY, EXECUTIVE OFFICES AND EXPORT DIVISION • PAWTUCKET, R. I., U. S. A.

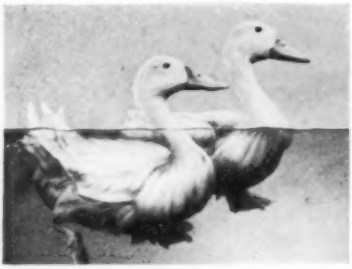
DISTRIBUTORS THROUGHOUT THE WORLD

OPENING MACHINERY • ONE PROCESS PICKERS • REVOLVING FLAT CARDS • DRAWING FRAMES • ROVING FRAMES (REGULAR AND HIGH-DRAFT) • SPINNING FRAMES (REGULAR AND HIGH-DRAFT) • TWISTERS • RUBBER COVERING MACHINES • ROVING TESTERS

THIS GIANT ROTARY KILN is used in producing UNITANE® Titanium Dioxide at one of the plants of Cyanamid's Calco Chemical Division. One of the world's largest producers of this important pigment, Calco supplies its high quality UNITANE brand in several grades to meet the specific requirements of the paint, rubber, paper and other industries which use this white pigment. Products of American Cyanamid Company's Calco Chemical Division are sold throughout the world under the famous Calco "Diamond" trademark.

Calco

Cyanamid ...a Partner in Industry



CYANAMID'S AEROSOL® WETTING AGENTS are widely used to increase the wetting properties of water by reducing its surface tension — with resultant faster wetting action. Principle is illustrated by the "sinking duck" on left which has been sprayed with dilute AEROSOL solution. Water quickly penetrates protective oil film which normally keeps duck's feathers dry and buoyant as on right. Cyanamid Wetting Agents are used to speed penetration of dyes and other materials in textile processing. They are also important in cleansers and detergents and in many other processes. We invite your inquiry.

Courtesy of The Asphalt Institute, N. Y.

PAVING AN AIRSTRIP AT NEW YORK'S LA GUARDIA AIRPORT calls for the laying down of "hot mix" aprons. Small amounts of tall oil in such pavings improve the adhesion of earth to the asphalt. TALL OIL also has countless other uses. Soaps, varnishes, waterproofing agents, wetting agents, paints, linoleum, disinfectants, printing inks, polishes and many types of greases are among the many products improved by use of tall oil. Consult us concerning your requirements.

INFORMATION ON THESE AND OTHER CYANAMID PRODUCTS and chemicals for drug, textile, leather, rubber, paper, ink, plastics, paint, mining and other industries is available on request. Our representative will be glad to consult with you, without obligation, on your need for any of the high quality products of our manufacture.

AMERICAN Cyanamid COMPANY

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

REPRESENTATIVES THROUGHOUT THE WORLD

Look what heat does to this bearing

Heat forces oil out of the pores of this Oilite self-lubricating bearing.

That's what happens when friction-generated heat reaches this bearing in a machine. The result is positive lubrication, longer machine life.

Oilite bearings or machine parts—*with or without lubrication*—can be pressed from powdered metal to your exact specifications. Write for details.

oilite

POWDERED METAL PRODUCTS

CHRYSLER EXPORT, DIVISION OF CHRYSLER CORPORATION, DETROIT 31, MICHIGAN